

Emergency department and urgent care clinician perspectives on digital access to past medical histories

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ABSTRACT

Objective To explore emergency department (ED) and urgent care (UC) clinicians' perceptions of digital access to patients' past medical history (PMH).

Methods An online survey compared anticipated and actual value of access to digital PMH. UTAUT2 (Unified Theory of Acceptance and Use of Technology 2) was used to assess technology acceptance. Quantitative data were analysed using Mann-Whitney U tests and qualitative data were analysed using a general inductive approach.

Results 33 responses were received. 94% (16/17) of respondents with PMH access said they valued their PMH system and all respondents with no digital PMH access (100%; 16/16) said they believed access would be valuable. Both groups indicated a high level of technology acceptance across all UTAUT2 dimensions. Free-text responses suggested improvements such as increasing the number of patient records available, standardisation of information presentation, increased system reliability, expanded access to information and validation by authoritative/trusted sources.

Discussion Non-PMH respondents' expectations were closely matched with the benefits obtained by PMH respondents. High levels of technology acceptance indicated a strong willingness to adopt. Clinicians appeared clear about the improvements they would like for PMH content and access. Policy implications include the need to focus on higher levels of patient participation, and increasing the breadth and depth of information and processes to ensure patient record curation and stewardship.

Conclusion There appears to be strong clinician support for digital access to PMH in ED and UC; however, current systems appear to have many shortcomings.

BACKGROUND

A shared electronic health record (SEHR) system is distinguished by its availability to multiple healthcare providers, typically working from different institutions across health services. SEHRs are intended to facilitate clinician access to past medical history (PMH) to improve patient care and/or reduce the cost of care.¹ A primary reason for building an SEHR system is to ensure that important patient information is available for unscheduled care such as medical emergencies.^{2,3}

WHAT IS ALREADY KNOWN ON THIS TOPIC

- ⇒ Providing emergency department (ED) and urgent care (UC) access to patients' past medical history (PMH) is often a key justification for large investments in shared electronic health records (SEHR) systems.
- ⇒ ED and UC clinicians have not accessed PMH to the extent that SEHR system implementers hoped they would.
- ⇒ There are a range of SEHR and PMH access systems in use that vary in design and effectiveness.
- ⇒ PMH access is higher for specific groups such as older or sicker patients.

WHAT THIS STUDY ADDS

- ⇒ Clinicians value being able to obtain high-quality PMH via an SEHR.
- ⇒ To be useful in a range of circumstances, PMH needs to provide a succinct summary of a patient's health status, current treatment regime and access to a wide spectrum of detailed PMH data relevant to the presentation.
- ⇒ ED and UC clinicians want to obtain PMH via a trusted clinical source.
- ⇒ By better understanding the attributes that ED and UC clinicians value, we can clarify high-value SEHR use cases and designs.
- ⇒ High levels of technology acceptance indicate a strong willingness to put in effort to adopt SEHR.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE AND/OR POLICY

- ⇒ Health system leaders should be encouraged to develop SEHR systems in close consultation with ED and UC clinicians.
- ⇒ Designing SEHR/PMH access systems enabling curation by a trusted source will increase the level of use.
- ⇒ Effort put into standardising the representation of source data is likely to increase utilisation.

Our previous review of SEHR use during unscheduled care found that while many SEHRs were large in scale and serviced many millions of patients, reported record utilisation rates by clinicians were variable but low.⁴ Higher record access rates were found in USA and Israeli healthcare maintenance



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organisations (16%–30%). Lower rates were reported for nation-scale systems (1.5%–2%) or when data exchange occurred between disparate provider systems. Our subsequent study of SEHR access in a hospital emergency department (ED) demonstrated that records were routinely used and usage was growing over time.⁵ Usage patterns revealed the highest rates for specific groups such as older or sicker patients.

It seems therefore that there are use cases where SEHR access is of higher value, and as a corollary, there should be SEHR designs that are more acceptable because they optimise support for those use cases. To clarify high-value SEHR use cases and designs, we undertook a survey of ED and urgent care (UC) clinicians across Australia and New Zealand. The study compared clinicians' experiences using an SEHR to access PMH to those of clinicians with no current access, and explored technology adoption levers and specific design attributes that may make SEHR access most useful. We also explored related questions, including the value of accessing PMH during the COVID-19 (SARS-CoV-2) pandemic, of accessing advance care directives (ACDs), as well as the potential risks of using PMH, and specifically, whether accessing such data introduces a framing bias that negatively influences clinician decision making.⁶

Typically, an individual's perceptions of a new technology change after exposure to it. In this study, we sought to compare the expectations of ED and UC clinicians without access to their patients' PMH to the experiences of those clinicians that did have access.

METHODS

Study design

We surveyed ED and UC clinicians practising in Australia and New Zealand.

Responses from ED and UC clinicians who reported having access to SEHR systems containing patients' PMH respondents were compared with those of clinicians who reported that they had no access (non-PMH respondents). Analysis groups were based on self-reported access to SEHR.

We compared the anticipated versus perceived actual overall value of access to patients' PMH and the anticipated and actual perceived value by patient age, triage category and presenting condition. We compared the anticipated versus perceived actual value of separate sections of the patient record (demographic data, medications, pathology, problem list) and information from additional external sources.

Setting and study participants

Participants were members of either The Australian College of Emergency Medicine, the registration body for all Australian and New Zealand ED doctors; or The Royal New Zealand College for Urgent Care, the registration body for New Zealand's UC doctors.

PROCEDURE

Permission to survey college members was granted by their respective research committees. Advertisements were placed in the electronic newsletters of each organisation. The advertisements contained an electronic link to the survey.

A Qualtrics survey containing 35 multiple-choice questions using a 5-point Likert symmetric agree–disagree scale, with another eight questions inviting written responses was created (see online supplemental appendix 1). Wording was tailored to reflect whether respondents had or did not have access to an SEHR. The survey was conducted from 8 February 2021 to 15 September 2021.

ANALYSIS

Survey data were exported from Qualtrics into SPSS V.26 and analysed using Mann-Whitney U tests to report a median value and IQR for each comparison. Differences were considered to be statistically different when $p < 0.05$.

Free-text answers were analysed using a general inductive approach,⁷ to condense response data into a brief summary form and identify common themes from the data.

MEASURES

We captured each respondent's age, gender, length of time in practice, region, and whether they were working in a rural, regional or urban setting.

A set of technology acceptance questions within the survey were designed using UTAUT2⁷ (the Unified Theory of Acceptance and Use of Technology 2) framework (see figure 1). UTAUT2 is used to identify users' behavioural intentions in relation to a new technology.

We compared respondents with and without access to PMH, including their behavioural intention to use an SEHR for PMH access, the perceived value of such

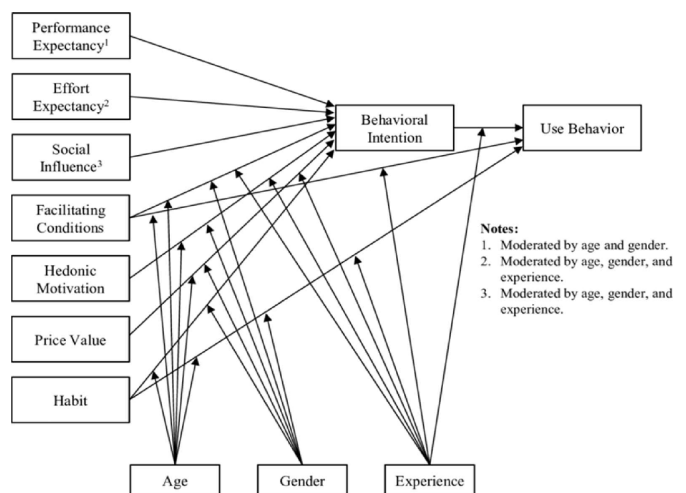


Figure 1 The Unified Theory of Acceptance and Use of Technology 2 (from Venkatesh *et al*⁸ reproduced courtesy of MIS Quarterly).

access, and the different circumstances or clinical condition types for which they would access PMH. Acceptance questions were designed to measure the seven UTAUT2 factors that influence the uptake of new technology: performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price/value and habit.⁸ (see online supplemental appendix 2).

Respondents were given eight free-text questions inviting them to suggest potential PMH system capabilities and improvements to their existing systems. We also sought respondents' views on a small set of questions including accessing ACDs via an SEHR and the risk of framing bias when accessing an SEHR. A framing bias occurs when the manner of information presentation influences its interpretation.⁵ We finally explored the likely value of accessing PMH during a pandemic.

RESULTS

We obtained responses from 33 ED and UC clinicians from New Zealand and Australia during the COVID-19 pandemic. 18 respondents were female, 14 male and 1 respondent did not state a gender. Five respondents practised in rural locations, 5 in provincial centres and 23 practised in an urban setting.

Sixteen respondents said that they had no source of PMH (non-PMH respondents), and 17 respondents indicated they accessed PMH via one of a variety of regional or national SEHR systems (PMH respondents).

Of the 17 respondents who reported having access to SEHR, 53% (n=9) reported using their SEHR system to look at PMH for more than 60% of their patients and 35% (6/17) reported obtaining PMH for more than 80% of patients. Most PMH respondents said their SEHR system was highly valuable (59%; n=10), while 35% (n=6) said it was somewhat valuable (see table 1). All non-PMH respondents (100%; n=16) said that they believed PMH access would be valuable. Non-PMH respondents were uniformly of the view that PMH access would be highly valuable, whereas PMH respondents were more diverse in their assessment, with responses not equally distributed between the groups despite having the same median (non-PMH: Mdn=5, n=16 vs PMH: Mdn=5, n=17, p=0.005, r=0.449).

We asked non-PMH respondents whether they would only rely on PMH if they knew it to be up to date and accurate. 75% (12/16) agreed or strongly agreed. However, 12.5% (2/16) were neutral and 25% (4/16) of non-PMH

respondents disagreed, saying they would review any available information, regardless of whether they had concerns about its completeness or accuracy.

We saw the following statistically significant differences:

- ▶ More non-PMH respondents expected PMH to be valuable for treating eye problems: (non-PMH: Mdn=4, n=16 vs PMH: Mdn=3, n=17, p=0.040, r=0.36) and for treating head injuries: (non-PMH: Mdn=5, n=16 vs PMH: Mdn=3, n=17, p=0.011, r=0.44).
- ▶ More non-PMH respondents expected PMH to be valuable for adult patients: (non-PMH: Mdn=5, n=16 vs PMH: Mdn=4, n=17, p=0.043, r=0.35).
- ▶ More non-PMH respondents wanted to access general practice-held data: (non-PMH: Mdn=5, n=16 vs PMH: Mdn=4, n=17, p=0.040, r=0.36) (see figure 2).

We saw no statistical differences between PMH and non-PMH respondents' perceptions of value for most conditions, patient age groups, history types and history sources (see table 2).

PMH respondents' reduced assessment of the value of PMH for treating adult patients confirms our earlier finding that PMH respondents found SEHR most useful when treating elderly patients and infants.

Non-PMH and PMH respondents were positive about the value of PMH in managing a patient suspected of exposure to infection during a pandemic and had similar estimates of the proportion of patients' records they would expect to look up (see table 2).

All non-PMH respondents believed access to ACDs would be valuable: (M=4.53, SD=0.000). PMH respondents also saw value in having access to ACDs: (M=3.12, SD=0.857).

UTAUT2 analysis

Our UTAUT2 analysis showed that non-PMH and PMH respondents had largely similar responses to the acceptability of digital PMH access across all seven technology acceptance factors. PMH respondents found PMH access to be valuable. Non-PMH users' similarly positive assessments of the likely benefits mean that they are likely to expend considerable effort to adopt PMH-access technology once it becomes available.

There was a considerable alignment of views and only two exceptions to that: non-PMH respondents believed their colleagues would be more supportive of PMH use: (non-PMH: Mdn=4.5, N=16 vs PMH: Mdn=4, n=17, p=0.023, r=0.40) and non-PMH respondents were more positive about the level of economic value of PMH to

Table 1 PMH respondents' views regarding the value of their existing PMH system

Question	M	SD
How valuable is your principal patients' PMH retrieval system?	4.53	0.624
How easy to use is your principal patients' PMH retrieval system?	3.71	0.686
Do you consider your current method for electronic access of patients' PMH records to be efficient?	3.35	1.115

Responses are on a Likert scale from 1 (low) to 5 (high).
PMH, past medical history.

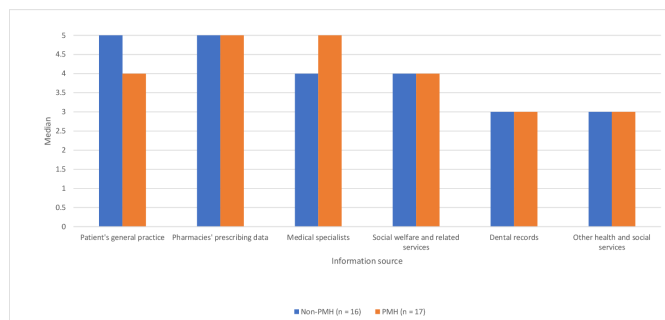


Figure 2 A comparison of non-PMH and PMH respondents' views of the value of access to external information sources. Responses are on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). PMH, past medical history.

their organisations: (non-PMH: Mdn=5, n=16 vs PMH: Mdn=4, n=17, $p=0.021$, $r=0.40$) (see [table 3](#)).

Free-text responses

Free-text responses from PMH and non-PMH respondents are presented in Appendix 3. Five key themes emerged after analysis:

- 1. Reach:** Respondents indicated a desire for more patients to have accessible PMH, thus improving the likelihood of locating a record. One respondent stated: 'Many patients do not have a record.' Other respondents reported difficulties finding records because they were held on multiple different unconnected regional systems. A respondent stated: 'There is no significant communication between regions, that is, the electronic data records are separated amongst the different regions.'
- 2. Ease of use:** Ease of use was a common issue: 'Information needs to be quickly and easily accessible, and in a format that is useable, that is, summarised, with option to expand out any diagnoses/areas for investigation results, specialist opinions, management, medications.' Several respondents indicated frustration, with one saying 'Too many clicks, too slow to load. Information (is) spread across too many different systems that don't talk to each other in real-time or to other hospitals/healthcare systems.'
- 3. Value of information:** Some respondents expressed a need to increase the value of the information available, that is, increasing the depth, breadth and quality of information in a PMH. One respondent stated: 'The information available needs to include all aspects including mental health. These are often separate which can lead to errors.' Another respondent commented: 'It must be up to date or you are basing decisions on old information. This is especially relevant with medication information.' Some clinicians wanted general information about a patient's health and current treatment, whereas others had specific interests in a very wide range of detailed aspects of a patient's health.
- 4. Integrity of information:** The fourth theme was the need to be able to rely on information provided by an SEHR, with one respondent saying: 'Curation of PMH

is essential to the usefulness of any system designed to help ED clinicians, but what is critical is; who does it?—It's a fairly high-end cognitive task and so can't be automated or easily contracted out. It needs someone with a thorough understanding of the situation.'

Respondents indicated that while any information they can access is likely to have some value, they wish to be able to rely on information they obtain as being completely trustworthy and able to be acted on with absolute certainty: 'In practice the best approach is to get information from someone at a reasonably high level who has put the effort in to understanding the situation for purposes other than providing a summary.'

- 5. The risk of framing bias:** In the free-text responses, respondents indicated various views regarding potential risks arising from forming incorrect assumptions based on reliance on PMH. However, several respondents commented that that while availability of a patient's PMH can lead to bias, the benefits of having access to PMH far outweigh the risks of being without it.

"I think the risks are lower than current risks of not having access to this information."

"PMH can lead to bias but I think benefit far outweighs risk."

"Less information is associated with significant risk."

"I feel the errors would be worse by NOT knowing the information".

Respondents listed 29 categories of PMH they would like to have made accessible via an SEHR. These included:

- ▶ Previous radiology, pathology.
- ▶ Hospital summaries.
- ▶ Medication history.
- ▶ Direct access to GP notes.
- ▶ Patient's goals of care.
- ▶ Preferred language.
- ▶ Next of kin's name and contact details.
- ▶ Care planning information/advance directives.
- ▶ Enduring power of attorney.
- ▶ Information from external services such as methadone clinics, drug addiction services, aboriginal medical services.
- ▶ Previous ED presentations or hospital admissions.
- ▶ Records held by nursing homes and palliative care services.
- ▶ Data on conditions treated and/or surgeries performed in private hospitals.

See full list in online supplemental appendix 3.

DISCUSSION

ED clinicians and UC clinicians are aware that their lack of knowledge about a presenting patient's healthcare status and previous and current treatment history is a challenge for many patient encounters.⁹ While many studies demonstrate that clinicians complain of burnout associated with the use of electronic health records,^{10 11} respondents in

Table 2 Comparison of non-PMH and PMH respondents' views of PMH access

Question	Non-PMH (n=16)	PMH (n=17)	Mann-Whitney			
	Median (IQR)	Median (IQR)	U	Z	P	R
How valuable do you believe PMH would be/ how valuable is it to have access to PMH?	5 (5–5)	5 (5–5)	80.000	–2.838	0.005	0.49
For a patient you see for the first time with no prior hospital records, how useful is it/ how valuable would it be to access PMH for patients triaged as 'urgent' for the following presenting conditions?						
Chest pain	5 (4.25–5)	5 (4–5)	118.000	–0.801	0.423	
Collapse/fall	5 (4–5)	5 (4–5)	116.500	–0.807	0.419	
Eye problem	4 (3–4.75)	3 (2–4)	80.500	–2.056	0.040	0.36
Head injury	5 (3–5)	3 (2–4)	67.500	–2.543	0.011	0.44
Lower limb injury	2.5 (2–4)	2 (2–3.50)	115.500	–0.789	0.430	
Unknown condition	5 (4.25–5)	5 (4–5)	117.000	–0.822	0.411	
Multiple injuries (result of an accident)	4 (3–4.75)	3 (3–5)	127.500	–0.325	0.745	
Post-ictal/Altered conscious state	5 (5–5)	5 (4–5)	105.500	–1.380	0.168	
Unwell	5 (3.25–5)	4 (4–5)	115.000	–0.849	0.396	
For a patient you see for the first time with no prior hospital records, how useful is it/ how useful would it be to access past medical history records for patients triaged as 'urgent' for the following age groups?						
Infants (0–1)	4 (3–5)	3 (2.5–5)	119.000	–0.637	0.524	
Children (2–11)	4 (3–5)	4 (2.5–4.5)	107.500	–1.064	0.287	
Adolescents (12–18)	4 (3–5)	3 (2.5–4.5)	103.500	–1.224	0.221	
Adults (19–64)	5 (4–5)	4 (3–4.5)	83.500	–2.019	0.043	0.35
Elderly (65+)	5 (5–5)	5 (5–5)	128.000	–0.463	0.643	
Patients irrespective of age	4.5 (4–5)	4 (3–4.5)	95.500	–1.551	0.121	
In general, which components of a patient's PMH are/would be most valuable?						
Demographics (age, address, etc)	3 (3–4)	3 (2–4)	104.000	–1.201	0.230	
Pathology and radiology results	5 (4–5)	5 (4–5)	118.500	–0.738	0.461	
Medications (prescribing information)	5 (5–5)	5 (5–5)	135.500	–0.044	0.965	
Problem list	5 (4–5)	5 (4–5)	122.500	–0.583	0.560	
Medical history, allergies	5 (5–5)	5 (4.5–5)	121.000	–0.808	0.419	
Specialist/allied health reports	4.5 (4–5)	4 (4–5)	119.000	–0.673	0.501	
Hospital discharge summaries	5 (4–5)	5 (4–5)	129.000	–0.291	0.771	
GPs' most recent comments	4 (4–5)	4 (4–5)	115.000	–0.828	0.408	
ECGs	5 (5–5)	5 (4–5)	112.000	–1.216	0.224	
In general, how valuable would it be to access information from the following external sources?						
The patient's general practice(s)	5 (5–5)	4 (4–5)	88.000	–2.058	0.040	0.36
Pharmacies prescribing data	5 (4–5)	5 (4–5)	131.500	–0.184	0.854	
Medical specialists, for example, ophthalmology, ENT	4 (4–5)	5 (4–5)	115.500	–0.853	0.394	
Social welfare and related services	4 (3.25–4)	4 (3–4)	130.500	–0.226	0.821	
Dental records	3 (3–3.75)	3 (3–4)	113.500	–0.876	0.381	
Other health and social services	3 (3–4)	3 (3–4)	128.000	–0.328	0.743	
In which triage categories does diagnosis and treatment of unfamiliar patients do you believe would most benefit/ do most benefit from accessing patients' PMH records?						
Resuscitate	5 (4.25–5)	5 (4–5)	110.500	–1.102	0.270	
Emergency	5 (4.25–5)	5 (4–5)	100.000	–1.526	0.127	
Urgent	5 (4–5)	4 (4–5)	126.500	–0.376	0.707	
Semiurgent	4 (3–5)	3 (3–4)	96.500	–1.516	0.130	
Non-urgent	3.5 (2.25–5)	3 (2.5–4)	107.500	–1.069	0.285	
To what extent do you believe that having access to patients' PMH would help you with presentations during a viral pandemic?	4.5 (4–5)	4 (4–5)	110.000	–1.062	0.288	

Continued

Table 2 Continued

Question	Non-PMH (n=16)	PMH (n=17)	Mann-Whitney			
	Median (IQR)	Median (IQR)	U	Z	P	R
To what extent do you believe that having access to patients' PMH can help you manage a patient suspected of exposure to infection during a viral pandemic?	4.5 (4–5)	4 (3.5–4)	124.000	–0.464	0.642	
In a state of pandemic alert, for what proportion of patients would you expect to access patients' PMH?	3 (1–3)	2 (1–3)	128.000	–0.300	0.764	

Responses are on a Likert scale from 1 (low) to 5 (high).
ECG, electrocardiogram; ENT, ear, nose and throat; GP, General Practitioner; PMH, past medical history.

this study indicated that access to high-quality SEHR data and digital PMH was valuable and worth accessing.

PMH respondents' reduced assessment of the value of PMH for treating adult patients confirms our earlier finding that PMH respondents found SEHR most useful when treating elderly patients and infants.⁵

Developing PMH access via SEHR systems has been one of the main objectives of most national health systems over the past three decades. However, few national-scale or regional PMH systems have been reported doing so successfully. The largest and most expensive attempt was the UK Government's Summary Care Record (SCR) programme. Key problems hampered the SCR, including a lack of accurate and relevant data, ongoing system

integration issues and interoperability problems, and lack of trust by patients over the privacy and security of their sensitive data. Privacy fears, concerns about the accuracy and relevance of data, and challenges to SEHR integration remain live issues in this study.

Typically, an individual's expectations for a new technology change after exposure to it. In this study, ED and UC clinicians' responses showed that clinicians without access to their patients' PMH had very similar expectations and objectives to those who do.

Both groups' responses indicated that they wanted access to an SEHR that provided a robust, easily accessible, up-to-date general picture of a patient's health status and treatment, from which they could access links to far

Table 3 Comparison of PMH and non-PMH respondents' views on technology adoption factors (UTAUT 2)

UTAUT2 attribute and related question	Non-PMH (n=16)	PMH (n=17)	Mann-Whitney			
	Median (IQR)	Median (IQR)	U	Z	P	R
Performance expectancy						
To what extent do you believe that having access to patients' PMH would improve clinical outcomes?	4 (4–5)	4 (4–5)	128.000	–0.330	0.741	
Effort expectancy						
To what extent do you believe that access to patients' PMH would improve your clinical effectiveness?	4.5 (4–5)	5 (4–5)	120.500	–0.640	0.522	
Social influence						
To what extent do you believe that implementation of a PMH system is/would be supported by colleagues?	4.5 (4–5)	4 (4–5)	76.500	–2.274	0.023	0.40
Facilitating conditions						
To what extent do you believe that implementation of a PMH system is/would be supported by your organisation's management?	4 (4–5)	4 (3–4)	109.500	–1.014	0.310	
Hedonic motivation						
To what extent do you believe having access to PMH is likely to/does make your job more enjoyable?	4 (4–4.75)	4 (2.5–4.5)	109.000	–1.052	0.293	
Price/Value						
To what extent is a PMH/would a PMH be a good investment?	5 (5–5)	4 (3.5–5)	80.000	–2.311	0.021	0.40
Habit						
Approximately what percentage of your day do you spend using any/all of your organisation's current IT systems?	4 (2.5–5)	5 (3.25–5)	104.500	–1.267	0.205	

Responses are on a Likert scale from 1 (low) to 5 (high).
IT, information technology; PMH, past medical history; UTAUT2, Unified Theory of Acceptance and Use of Technology 2.

more detailed information when needed. In addition, clinicians want PMH data presented in a uniform format that is easy to navigate and interpret and that comes from an authoritative and trusted source.

Respondents identified multiple improvements to their existing PMH access including broadening access to include more patients, making them more dependable and easier to use, while providing access to a greater breadth and depth of information and the need to develop processes that enable patient record curation and stewardship.

While incremental improvements can be made on a case-by-case basis, a more focused and systemic approach to SEHR design for PMH may be needed. Unscheduled care represents a clear use case for SEHRs, where system use is not to record activity but to inform decisions, and this difference is likely to have specific design implications.¹²

This echoes earlier work. Fries stressed the importance of standardised presentation to improve the speed and ease with which clinical data could be reviewed and acted on.¹³ Whiting-O'Keefe *et al* demonstrated the utility of methodological patient record summarisation versus less rigorously structured record formats.¹⁴

Given the pressures on healthcare systems and the level of resources spent to date on patient record sharing, it is surprising that more progress has not been made. ED and UC clinicians are still a long way away from having consistent and reliable access to patients' PMH, which is information that almost always exists already, somewhere, buried deep in a healthcare system.

The price of this inadequacy appears significant. The direct costs are potentially huge, with many countries spending billions of dollars on these systems. However, the opportunity costs are likely even greater. Health system efficiency and patients' quality of life could both be greatly improved if patients' PMH could be shared more effectively.^{9 15}

LIMITATIONS

This study was undertaken throughout 2020 and 2021 when Australia and New Zealand were affected by the worldwide COVID-19 global pandemic. All hospital EDs and UC clinics were under considerable pressure during this period. Despite considerable efforts by The Royal Australasian College for Emergency Medicine and The Royal New Zealand College of Urgent Care, the survey response rate was lower than anticipated. Accordingly, the results may have limited generalisability to the population of ED and UC clinicians throughout New Zealand and Australia. However, we identified the need to create readily accessible and completely reliable patient record data sets; findings which can be further explored in future research. Such research might provide insights that would enable us to build PMH access systems that will become indispensable within ED and UC settings.

CONCLUSION

There is strong clinician support for access to ED and UC patients' PMH. ED and UC clinicians know what they would like to see in a PMH system, with both non-PMH and PMH respondents' views closely aligned. Designing electronic record systems specifically optimised for ED and UC decision support appears to be both needed and likely to come with significant benefits.

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Contributors TCB conceived this research and designed and conducted the study with guidance from, and under the supervision of, EC and DL. TCB drafted the manuscript with input from all authors. All authors provided revisions for intellectual content. All authors read and approved the final manuscript. TCB is the guarantor.

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Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Macquarie University HREC (Australian Human Research Ethics Committees) Approval number: 52020905322939. Participants gave informed consent to participate in the study before taking part.

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REFERENCES

- 1 Kuperman GJ. Health-information exchange: why are we doing it, and what are we doing? *J Am Med Inform Assoc* 2011;18:678–82.
- 2 Ben-Assuli O, Shabtai I, Leshno M, *et al*. EHR in emergency rooms: exploring the effect of key information components on main complaints. *J Med Syst* 2014;38:36.
- 3 Cross M. The complications of a botched operation. *The Guardian*, 2005. Available: <https://www.theguardian.com/technology/2005/nov/24/comment.epublic> [Accessed 7 Dec 2021].
- 4 Bowden T, Coiera E. The role and benefits of accessing primary care patient records during unscheduled care: a systematic review. *BMC Med Inform Decis Mak* 2017;17:138.
- 5 Bowden T, Lyell D, Coiera E. Emergency care access to primary care records: an observational study. *BMJ Health Care Inform* 2020;27:e100153.
- 6 Beratšová A, Krchová K, Gažová N. Framing and bias: a literature review of recent findings. *Cent Eur J Manag* 2016;3.
- 7 Thomas DR. A general inductive approach for qualitative data analysis, 2003. Available: <https://citeseerx.ist.psu.edu/viewdoc/>



- download?doi=10.1.1.462.5445&rep=rep1&type=pdf [Accessed 7 Dec 2021].
- 8 Venkatesh V, Thong JWL, Xu X. Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS Quarterly* 2012;36:157–78.
 - 9 Kayden S, Anderson PD, Freitas R. *Emergency department leadership and management*. Cambridge: Cambridge University Press, 2015.
 - 10 Gardner RL, Cooper E, Haskell J, *et al*. Physician stress and burnout: the impact of health information technology. *J Am Med Inform Assoc* 2019;26:106–14.
 - 11 National Academy of Medicine, National Academies of Sciences, Engineering, and Medicine, Committee on Systems Approaches to Improve Patient Care by Supporting Clinician Well-Being. *Taking action against clinician burnout: a systems approach to professional well-being*. Washington, DC: The National Academies Press, 2019.
 - 12 Greenhalgh T, Stramer K, Bratan T. The devil's in the detail: final report of the independent evaluation of the Summary Care Record and HealthSpace programmes, 2010. Available: <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.395.983&rep=rep1&type=pdf> [Accessed 7 Dec 2021].
 - 13 Fries JF. Alternatives in medical record formats. *Med Care* 1974;12:871–81.
 - 14 Whiting-O'Keefe QE, Simborg DW, Epstein WV, *et al*. A computerized summary medical record system can provide more information than the standard medical record. *JAMA* 1985;254:1185–92.
 - 15 Blanchard JC, Rudin RS. Improving hospital efficiency through data-driven management, 2015. Available: https://www.rand.org/pubs/research_reports/RR1342.html [Accessed 7 Dec 2021].

Enabling Emergency Department Clinicians to Access a Patient's Past Medical History

Start of Block: Consent

Macquarie University HREC Approval number: **52020905322939**

Participant Information Statement and Consent

Description and risks

You are invited to participate in a study of emergency department (ED) and urgent care (UC) clinicians' preferences regarding access to a patient's past medical history (PMH).

For the purpose of this study, past medical history (PMH) is any patient information that is additional to that held on your hospital's computer system. This may include records from general practice or specialists.

If you already have systems for accessing patients' PMH in your emergency department or urgent care facility, then you will be asked questions about your attitudes to it. If you do not have such a system, we will ask questions about your attitudes to obtaining such access. We do not expect there to be any risks associated with participation in this study, however, should you have any concerns please contact Tom Bowden (+64 21 874 154 / Thomas.bowden@hdr.mq.edu.au).

Use of the results

The data from this study will be kept for a minimum of five years from the most recent publication date and will be securely stored on a password-protected computer locked in the study centre. Any data gathered will potentially be used for future research; however, the Macquarie University Human Research Ethics Committee must first approve any such future research before any of your data is used. The results of the study will be published in peer-reviewed journals and may be presented at scientific conferences. Participation in this study is entirely voluntary. You are not obliged to participate and if you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence. The study is being conducted by:

Mr Tom Bowden	+64 21 874 154	Thomas.bowden@hdr.mq.edu.au
Dr David Lyell	+612 9850 2434	david.lyell@mq.edu.au
Professor Enrico Coiera	+612 9850 2403	enrico.coiera@mq.edu.au

Completing this survey

Thank you for agreeing to participate in a survey of emergency department and urgent care clinicians. This survey should take between 12 and 15 minutes to complete.

Confidentiality and disclosure of information

No personal details will be gathered during the course of the survey, therefore there will be no way of tracing any comments made. Any information that is obtained in connection with this study will remain confidential and will be disclosed only with your permission, except as required by law. If you give us your permission by selecting "I consent" below, we plan to publish the results in scientific journals and in presentations at academic conferences. The ethical aspects of this study have been approved by Macquarie University Human Research Ethics Committee. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics and Integrity (telephone +612 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

Your consent

Your decision to participate will not prejudice your future relations with Macquarie University. Participation in this study is entirely voluntary. You are not obliged to participate and if you decide to participate, you are free to withdraw while completing the questionnaire by closing your web browser. Once the questionnaire is submitted it will no longer be possible to withdraw as individual participants cannot be identified in the recorded data. Please feel free to direct any additional questions to Tom Bowden (+64 21 874 154 / Thomas.bowden@hdr.mq.edu.au). You may print a copy of this participant information and consent form via your web browser for your records.

Do you consent to participate in this research?

- I consent / continue
- I do not consent / exit

Page Break

End of Block: Consent

Start of Block: Demographics/screening

Q2.1 How many years have you worked in an emergency department or urgent care facility?

- 0–10
- 11–20
- 21–30
- 31–40
- 41–50
- 51+
-

Q2.2 Please indicate your age:

- 19–29 years
- 30–39 years
- 40–49 years
- 50–59 years
- 60+ years
-

Q2.3 Please state your gender:

- Male
- Female
- Other (please specify) _____
-

Q2.4 Where is the emergency department or urgent care facility which is your primary place of practice?

- Australian Capital Territory
 - New South Wales
 - Northern Territory
 - Queensland
 - South Australia
 - Tasmania
 - Victoria
 - Western Australia
 - North Island of New Zealand
 - South Island of New Zealand
 - Other (please specify below)
-

Q2.5 Please provide further information about your emergency department or urgent care facility. Is it:

- Rural
 - Regional
 - Urban
-

Q2.6 When a patient presents to your emergency department or urgent care facility, how do you primarily access a patient's past medical history if the information is not in your hospital's patient record system?

- By contacting the patient's GP
 - We do not access a patient's past medical history
 - We can electronically access past medical history from one or more external sources
-

Q2.7 If you have other non-electronic means of accessing a patient's past medical history, please specify:

End of Block: Demographics/screening

Start of Block: Series B

Q3.1 How valuable do you believe it would be to access detailed information (including pathology, radiology, prescribing information, specialists' letters and hospital discharge summaries from your patients' past medical history)?

- Highly valuable
 - Somewhat valuable
 - Neutral
 - Not especially valuable
 - Not at all valuable
-

Q3.2 I would only be willing to rely upon primary care-sourced information that I was fully satisfied was always complete, accurate and up-to-date.

- Strongly agree
 - Agree
 - Neutral
 - Disagree
 - Strongly disagree
-

Q3.3 I would only be willing to rely upon primary care-sourced information that I was satisfied was presented in a manner that could be accessed in less than one minute and the contents assessed within two to three minutes.

- Strongly agree
 - Agree
 - Neutral
 - Disagree
 - Strongly disagree
-

Q3.4 Do you have any comments on the risk of information from patients' past medical history records leading to errors or patient safety risks?

Q3.5 For a patient you see for the first time, with no prior hospital records, how useful would it typically be to access the patient's past medical history records (for a patient triaged as "urgent") for the following presenting conditions?

	Major benefit	Significant benefit	Modest benefit	Meagre benefit	No benefit
Chest pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collapse/fall	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eye problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Head injury	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lower limb injury	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unknown condition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Multiple injuries (as the result of an accident)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post ictal/altered conscious state	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unwell	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.6 For a patient you see for the first time with no prior hospital records, how useful would it be to access the patient's PMH records (for a patient triaged as "urgent") for the following age groups?

	Major benefit	Significant benefit	Modest benefit	Minor benefit	No benefit
Infants (0–1 year)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Children (2–11 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adolescents (12–18 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adults (19–64 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elderly patients (65+ years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Patients irrespective of age	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.7 In which triage categories will diagnosis and treatment of unfamiliar patients most benefit from accessing patient's past medical history?

	Major benefit	Significant benefit	Modest benefit	Meagre benefit	No benefit
1 (Resuscitate)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 (Emergency)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 (Urgent)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 (Semi-urgent)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 (Non-urgent)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.8 In general, which of the following components of a patient's past medical history record are likely to be most valuable?

	Very valuable	Moderately valuable	Of low value	Of negligible value	Of no value
Demographic info (age, address etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pathology and radiology results	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medications (prescribing information)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problem list	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medical history, allergies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Specialist/Allied health reports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospital discharge summaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GPs' most recent comments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ECGs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.9 Please indicate if other parts of a patient's past medical history are likely to be helpful to you:

Q3.10 In general, how valuable would it be to access information from the following sources?

	Most valuable	Moderately valuable	Of low value	Of negligible value	Of no value
The patient's general practice(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pharmacies' prescribing data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medical specialists e.g., ophthalmology, ENT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social welfare and related services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dental records	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other health and social services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q3.11 Please indicate any other sources of data you believe you would find useful:

Q3.12 Would it be useful to have a patient's past medical history retrieval system that provided access to/or indicated availability of your patients' advance care directives?

- Yes
- No
- When available
- Unsure
-

Q3.13 In what circumstances would having an advance care directive be useful?

Q3.14 Do you believe it would it reduce a patients' past medical history retrieval system's usefulness if some of a patient's past medical history could be removed or masked by the GP (without the removal being indicated)?

- Major reduction in usefulness
- Moderate reduction
- Minor reduction
- Negligible reduction
- No reduction
-

Q3.15 Do you believe it would it reduce a patient's past medical history retrieval system's usefulness if some of a patient's past medical history could be removed or masked by the GP? (with the removal being indicated)

- Major reduction in usefulness
 - Moderate reduction
 - Minor reduction
 - Negligible reduction
 - No reduction
-

Q3.16 Do you wish to make any comments on the likely impact of deliberately masking or removing some sensitive information from a patient's past medical history?

Q3.17 To what extent do you believe that making primary care-held patient records quick and easy to access is important?

- Very important
 - Moderately important
 - Nice to have
 - Not important
-

Q3.18 To what extent do you believe that it is important that any patients' past medical history information retrieved should be capable of being transferred into/stored within your hospital's patient record system?

- Very important
 - Moderately important
 - Nice to have
 - Not important
-

Q3.19 To what extent do you believe that access to patients' past medical history would improve your clinical effectiveness?

- Major improvement
 - Significant improvement
 - Modest improvement
 - Minor improvement
 - Not an improvement
-

Q3.20 To what extent do you believe having access to patients' past medical history is likely to make your job more enjoyable?

- Likely to increase enjoyment
 - Significant increase
 - Modest increase
 - Negligible increase
 - Unlikely to increase enjoyment
-

Q3.21 To what extent do you believe that having access to patients' past medical history would improve clinical outcomes?

- Would make outcomes much more certain
 - A bit more certain
 - Neutral
 - Slightly less certain
 - Much less certain
-

Q3.22 Are you aware of any plans within your organisation to implement an IT system giving you access to patients' past medical history?

- I know that a PMH system is planned
 - I don't know if a PMH system is being planned
 - I don't believe there is a need
-

Q3.23 To what extent do you believe that an IT system to access to patients' past medical history would be a worthwhile investment?

- A very good investment
 - A moderately good investment
 - Of neutral value
 - Not a good investment
 - A poor investment
-

Q3.24 Have other new IT systems been successfully introduced within your organisation during the past five years?

- Yes
- No
- Unsure
-

Q3.25 Approximately what percentage of your day do you spend using any or all of your organisation's current IT systems?

- 11–20%
- 21–30%
- 31–40%
- 41–50%
- 51%+
-

Q3.26 Approximately how many times a day do you use your organisation's electronic patient record system?

- 0
- 1–3
- 4–6
- 7–9
- 10+
-

Q3.27 Please name or briefly describe any other IT applications that are not part of your organisation's electronic record patient system that you access during your working day:

Q3.28 To what extent do you believe that providing electronic access to patients' past medical history would be supported by your organisation's management?

- Likely to be strongly supported
- Likely to be moderately well supported
- Neutral
- Not likely seen as very important
- Not likely seen as at all important

Q3.29 To what extent do you believe that implementation of a system for retrieving patients' past medical history would be supported by your colleagues?

- Likely to be strongly supported
 - Likely to be moderately well supported
 - Neutral
 - Not likely seen as very important
 - Not likely seen as at all important
-

Q3.30 For approximately what percentage of patients would you expect to look up past medical history?

- None
 - 1–4%
 - 5–9%
 - 10–19%
 - 20–50%
 - 50%+
-

Q3.31 To what extent do you believe that learning how to access patients' past medical history is likely to be difficult?

- Unlikely to be difficult
 - I do not anticipate significant difficulties
 - May pose some difficulties
 - Very likely to be difficult
 - I don't know
-

Q3.32 To what extent do you believe that assessing and interpreting information within a patients' past medical history is likely to be difficult?

- Unlikely to be difficult
 - I do not anticipate significant difficulties
 - May pose some difficulties
 - Very likely to be difficult
 - I don't know
-

Q3.33 To what extent do you believe that having access to patients' past medical history would help you manage emergency department or urgent care patients' attendance during a viral pandemic?

- Likely to be very useful
 - Likely to be quite useful
 - Unlikely to be useful
 - May hinder
 - Will hinder
-

Q3.34 To what extent do you believe that having access to patients' past medical history could help you manage a patient suspected of exposure to infection during a viral pandemic?

- Likely to be very useful
 - Likely to be quite useful
 - Unlikely to be useful
 - May hinder
 - Will hinder
-

Q3.35 In a state of pandemic alert, for what proportion of patients would you expect to access patients' past medical history?

- A lot more than normal
 - A bit more
 - The same amount
 - A bit less than normal
 - A lot less than normal
-

Q3.36 Do you have any further comments or suggestions regarding the value of having access to patients' past medical history during the provision of emergency care?

End of Block: Series B

Start of Block: Series A

Q4.1 What is the name of the electronic system you principally use for retrieving patients' past medical history?

- My Health Record (Australia)
 - Manage My Health (New Zealand)
 - Health One (New Zealand)
 - Care Insight (New Zealand)
 - My hospital has a system that I use, but I do not know the name of it
 - Other (please name it and describe it below)
-

Q4.2 Please respond to subsequent questions with your principal system in mind.

Q4.3 How valuable is your principal patients' past medical history retrieval system?

- Highly valuable
 - Somewhat valuable
 - Neutral
 - Not especially valuable
 - Not at all valuable
-

Q4.4 How easy to use is your principal patients' past medical history retrieval system?

- Very easy
 - Quite easy
 - Neutral
 - Fairly difficult
 - Extremely difficult
-

Q4.5 Which aspect(s) of your principal patients' past medical history system do you find most helpful?

Q4.6 Which if any aspect(s) of your principal patients' past medical history system do you find hinder you?

Q4.7 Do you have any comments on the risk of information from patients' past medical history leading to errors or patient safety risks?

Q4.8 Is information from your principal patients' past medical history system automatically inserted into your organisation's electronic records system?

- Yes, information is automatically inserted into to our ED system
- We do it manually by cutting and pasting
- Information is view only
- Other (please specify below)

Q4.9 At which point in an ED presentation are you most likely to review a patient's past medical history?

- Before I see a patient
- While I am assessing a patient
- After I have commenced management of a patient
- At any time

Q4.10 For a patient you see for the first time with no prior hospital records, how useful is it to access past medical history for patients triaged as “urgent” for the following presenting conditions?

	Major benefit	Significant benefit	Modest benefit	Meagre benefit	No benefit (Don't use)
Chest pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Collapse/fall	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eye problem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Head injury	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lower limb injury	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unknown condition	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Multiple injuries (as the result of an accident)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Post ictal/altered conscious state	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unwell	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.11 For a patient you see for the first time with no prior hospital records, how useful is it to access past medical history records for patients triaged as “urgent” for the following age groups?

	Major benefit	Significant benefit	Modest benefit	Meagre benefit	No benefit (Don't use)
Infants (0–1 year)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Children (2–11 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adolescents (12–18 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adults (19–64 years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elderly patients (65+ years)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Patients irrespective of age	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.12 In which triage categories does diagnosis and treatment of unfamiliar patients most benefit from accessing patients' past medical history records?

	Major benefit	Significant benefit	Modest benefit	Meagre benefit	No benefit (Don't use)
1 (Resuscitate)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 (Emergency)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 (Urgent)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 (Semi-urgent)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 (Non-urgent)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.13 In general, which components of a patient's past medical history are most valuable?

	Very valuable	Moderately valuable	Of low value	Of negligible value	Of no value
Demographic info (age, address etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pathology and radiology results	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medications (prescribing information)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Problem list	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medical history, allergies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Specialist/Allied health reports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hospital discharge summaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
GPs' most recent comments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ECGs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.14 Please indicate what other parts of a patient's past medical history are helpful to you:

Q4.15 In general, how valuable would it be to access information from the following sources?

	Most valuable	Moderately valuable	Of low value	Of negligible value	Of no value
The patient's general practice(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pharmacies' prescribing data	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Medical specialists e.g., ophthalmology, ENT	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social welfare and related services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dental records	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other health and social services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4.16 Please indicate any other sources of data you believe you would find useful:

Q4.17 Does your existing past medical history record retrieval system provide you with access to, or indicate availability of your patients' advance care directives?

- Yes
 - No
 - When available
 - Unsure
-

Q4.18 Is having access to advance care directives useful?

- Always
 - Mostly
 - Seldom
 - Never
-

Q4.19 Does your existing system for accessing patients' past medical history records indicate whether it has withheld parts of patient history (e.g., sexual health related information, mental health information and/or any other information deemed sensitive by the GP)?

- Yes
 - No
 - Unsure
-

Q4.20 How much do you believe it would reduce the past medical history system's usefulness if some of a patient's past medical history can be removed or masked by the GP?

- Major reduction in usefulness
 - Moderate reduction
 - Minor reduction
 - Negligible reduction
 - No reduction
-

Q4.21 Do you wish to make any comments on the likely impact of deliberately masking or removing some sensitive information from a patient's past medical history?

Q4.22 Do you consider your current method for electronic access of patients' past medical history records to be efficient?

- Always
 - Mostly
 - Seldom
 - Occasionally
 - Not at all
-

Q4.23 Do you have any comments on the efficiency of your current electronic methods to access patients' past medical history records?

Q4.24 To what extent do you believe that having access to patients' past medical history improves your clinical effectiveness?

- It provides a major improvement
- Significant improvement
- Neutral improvement
- Negligible improvement
- No improvement

Q4.25 To what extent do you believe that having access to patients' past medical history makes your job more enjoyable?

- Major increase in enjoyment
- Significant increase
- Modest increase
- Negligible increase
- No increase

Q4.26 To what extent do you believe that having access to patients' past medical history makes you more effective?

- Major improvement in my success
- Significant improvement
- Modest improvement
- Minor improvement
- Does not improve my success

Q4.27 To what extent do you believe that having access to patients' past medical history improves clinical outcomes?

- Makes outcomes much more certain
 - A bit more certain
 - Neutral
 - Slightly less certain
 - Much less certain
-

Q4.28 To what extent do you believe that your organisation's investment in an IT system to access patients' past medical history has been worthwhile?

- Very good investment
 - Moderately good investment
 - Neutral
 - Not a good investment
 - A poor investment
-

Q4.29 Have other new IT systems been successfully introduced into your organisation during the past 5 years?

- Yes
 - No
 - Unsure
-

Q4.30 Approximately what percentage of your day do you spend using your ED's IT systems?

- 11–20%
 - 21–30%
 - 31–40%
 - 41–50%
 - 51%+
-

Q4.31 Approximately how many times a day do you use your hospital's electronic patient record system?

- 1–3
- 4–6
- 7–9
- 10+

Q4.32 Are there other IT applications that are not part of your organisation's electronic record system that you access during your working day?

- Yes
- No

Display This Question:

If Are there other IT applications that are not part of your organisation's electronic record system... = Yes

Q4.33 Please name or briefly describe any other IT applications that are not part of your ED's electronic record patient system that you access during your working day:

Q4.34 To what extent is providing electronic access to patients' past medical history supported by your organisation's management?

- Strongly supported
 - Moderately well supported
 - Neutral
 - Not seen as very important
 - Not seen as at all important
-

Q4.35 To what extent is electronic access to patients' past medical history supported by your colleagues?

- Strongly supported
 - Moderately well supported
 - Neutral
 - Not seen as very important
 - Not seen as at all important
-

Q4.36 For approximately what percentage of patients do you look up patients' past medical history?

- 0–20%
- 21–40%
- 41–60%
- 61–80%
- 80%+

Q4.37 To what extent do you believe that having access to patients' past medical history can help you with presentations during a viral pandemic?

- Likely to be very useful
- Likely to be quite useful
- Unlikely to be useful
- May hinder
- Will hinder

Q4.38 To what extent do you believe that having access to patients' past medical history can help you manage a patient suspected of exposure to infection during a viral pandemic?

- Likely to be very useful
 - Likely to be quite useful
 - Unlikely to be useful
 - May hinder
 - Will hinder
-

Q4.39 In a state of pandemic alert, for what proportion of patients would you expect to access patients' past medical history?

- A lot more than normal
 - A bit more
 - The same amount
 - A bit less than normal
 - A lot less than normal
-

Q4.40 Do you have any further comments or suggestions regarding the value of having access to patients' past medical history during the provision of emergency care?

End of Block: Series A

Appendix 2. UTAUT2 analysis

UTAUT is a tool that measures performance expectancy which is defined as the degree to which an individual believes the system will help him or her to attain gains in a job. The theoretical background comes from an individual's perception of usefulness, comprised of:

Performance expectancy – the extent to which the individual believes a system will help them do a job.

Effort expectancy – the anticipated degree of ease associated with use of the system.

Social influence – the degree to which an individual ED or UC clinician feels that it is important for others to believe that they should use the new system.

Facilitating conditions – the degree to which an individual believes infrastructure exists to use the system.

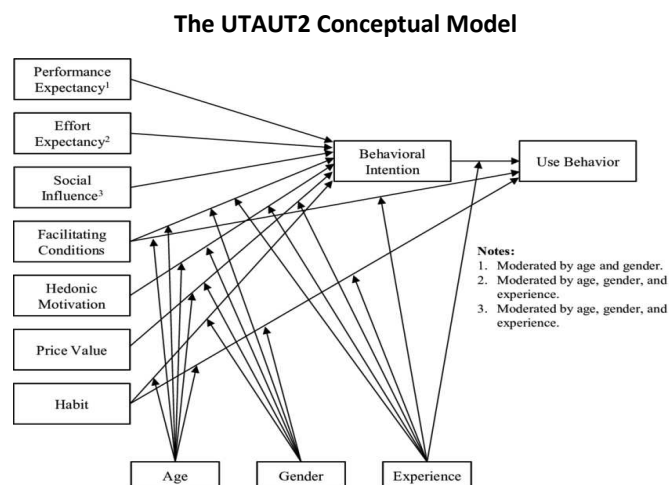
UTAUT2 is a further refinement of the UTAUT concept. UTAUT2 adds three further constructs and offers three moderating factors:

Hedonic motivation – the pleasure or personal fulfilment derived from using a technology.

Price value – the users' perceptions of whether or not investment in the system represents value.

Habit – the perceived relationship between prior behaviour and the anticipated form of the new behaviour.

Moderating Factors – in UTAUT2 performance expectancy, effort expectancy and social influence can be moderated by age, gender, and experience. Due to low response numbers and risk of introducing inaccuracy or bias, we decided not to calculate the impact of these factors.



The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) (from Venkatesh et al., 2012)
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Appendix 3. Summary of respondents' responses to the free-text questions

Key theme	Respondents' views	
<i>Record availability – Will I find that patient's record?</i>	A number of respondents indicated that they were disappointed by the percentage of patients their PMH system is likely to have a shared record for.	<p><i>"It is only useful if the patient has it activated. Many GPs I know have deleted their accounts due to security concerns, as have many patients."</i></p> <p><i>"Many patients do not have a record."</i></p> <p><i>"There is no significant communication between regions, i.e., the electronic data records are separated amongst the different regions."</i></p>
<i>System usability – Is the system intuitive to use and reliable?</i>	<p>Responses indicated that PMH users were finding a number of barriers to using their systems. These barriers included:</p> <p>-Connectivity issues</p> <p>-Information poorly set out and systems difficult to navigate</p> <p>-No ability to transfer information from the PMH into the ED or UC patient record.</p>	<p><i>"The system crashes regularly."</i></p> <p><i>"Currently we have had no access for approximately eight weeks because the whole system was hacked."</i></p> <p><i>"It is sometimes slow, has technical issues and we are unable to connect."</i></p> <p><i>"The link frequently crashes and will not load."</i></p> <p><i>"Any systems used need to be fit for purpose – information needs to be quickly and easily accessible, and in a format that is useable. i.e., summarised, with option to expand out any diagnoses/areas for investigation results, specialist opinions, management, medications."</i></p> <p><i>"It can be cumbersome and difficult to navigate."</i></p> <p><i>"Currently it's a brain dump where everything is just thrown in there with minimal organisation of information".</i></p> <p><i>"It would be helpful to be able to extract/export data directly onto current clinical system."</i></p>
<i>Information value – Will the information be of value to me/my patient?</i>	Respondents gave a list of additional information they would like to have access to:	<p><i>-The patient's goals of care</i></p> <p><i>-Advance directives</i></p> <p><i>-Patient's preferred language</i></p> <p><i>-Next of kin's name and contact details</i></p> <p><i>-Enduring power of attorney</i></p> <p><i>-Mental health records</i></p> <p><i>-Alcohol and drug records</i></p>

Key theme	Respondents' views	
		<ul style="list-style-type: none"> -A record of conditions treated or surgeries performed in private hospitals -The number of ED presentations -The number of hospital admissions -Surgery records -Methadone Clinics -Drug addiction services -Nursing homes – RE end of life decisions -Oncology services -Palliative care providers -Any cardiorespiratory diagnostic tests and spirometry Transthoracic echocardiograms (TTEs) -6 min walk tests -ECGs -Radiology, pathology and hospital summaries from interstate, -Most recent (dry) weight (children, dialysis patients and patients for aeromedical retrieval) -Physiotherapy, hand therapy, outpatient nursing/district nursing -ENT clinic or eye clinic visits -Non-government organisations -Information held by Aboriginal medical services -Tertiary cardiology services -Medication history (pharmacy dispensing records) -Direct access to GP notes
<p><i>Integrity – Can I truly depend upon this information?</i></p>	<p><i>Has the information been curated in a manner that assists me to understand and interpret it?</i></p>	<p><i>“The system is a central repository of secondary and incomplete structured information.”</i></p> <p><i>“Currently it is a brain dump where everything is just thrown in there with minimal organisation of information.”</i></p>

Key theme	Respondents' views	
<p><i>Am I being given information from records provided by another clinician that I can rely upon?</i></p> <p><i>Has the information been made available in an appropriately well –considered manner (and is not merely a hodgepodge of data).</i></p>	<p><i>“The system rarely has health summaries i.e. a list of past and current medical and surgical issues.”</i></p> <p><i>“Some medication lists do not have dosage and frequency of medications.”</i></p> <p><i>“The formatting can be atrocious, spitting out large amounts of redundant information. The medication lists should produce a current 'most recent' list every time a medication or allergy is altered, with the 'past history' of the list only visible if specifically requested. - In both cases the 'signal to noise' ratio needs to be optimised.”</i></p> <p><i>“Curation of PMH is essential to the usefulness of any system designed to help ED clinicians, but what is critical is- who does it? - it's a fairly high-end cognitive task and so can't be automated or easily contracted out. It needs someone with a thorough understanding of the situation. The term “appreciation” in the technical sense is on target; curation done by someone at a lower level can obliterate the value).”</i></p> <p><i>“In practice the best approach is to get information from someone at a reasonably high level who has put the effort in to understanding the situation for purposes other than providing a summary.”</i></p>	
<i>Masking/Redaction?</i>	<p><i>Concern that removal or masking of key pieces of information could mislead the ED or UC carer.</i></p>	<p><i>“I think it's completely unnecessary but if it makes patients feel better then that's fine. I would prefer if I knew something was hidden though.”</i></p> <p><i>“While it will reduce the usefulness of the information, patients have the right to choose who sees their medical information so this cannot be circumvented.”</i></p> <p><i>“Missing information could lead to diagnostic and prognostic errors.”</i></p> <p><i>“Redacting is costly in terms of time while relevant information is sought by other means.”</i></p> <p><i>“Redacting key information makes assessing patients with mental health presentations extremely difficult, especially when determining risk assessment.”</i></p>
<i>Advance care directives</i>	<p><i>In what circumstances would having an advance care directive be useful?</i></p>	<p><i>“Needed for all presentations!”</i></p> <p><i>“Any life-threatening circumstance.”</i></p>

Key theme	Respondents' views
<i>Risk of framing bias</i>	<p data-bbox="1039 320 1406 344"><i>"Any patient I can't ask questions of."</i></p> <p data-bbox="1039 352 1429 376"><i>"Resuscitation cases or the very unwell."</i></p> <p data-bbox="1039 384 1697 408"><i>"Unconscious, post arrest, septic resus, ambulance pre-notification."</i></p> <p data-bbox="1039 416 1496 440"><i>"No next of kin contactable for proper history."</i></p> <p data-bbox="1039 448 1816 504"><i>"In ALL circumstances especially with nursing home patients and oncology/other palliative patients."</i></p> <p data-bbox="1039 512 1682 536"><i>"In a patient with an unsurvivable pathology e.g. terminal cancer."</i></p> <p data-bbox="1039 544 1525 568"><i>"Presenting in arrest/peri-arrest as an 'unknown'."</i></p> <p data-bbox="562 592 1010 679"><i>Concern that an ED or UC clinician might jump to a wrong conclusion on the basis of information created previously.</i></p> <p data-bbox="1039 592 1861 647"><i>"When there is a lot of documentation and past history it can sometimes cause you to fall into fixation thinking regarding diagnoses."</i></p> <p data-bbox="1039 655 1861 679"><i>"I think the risks are lower than current risks of not having access to this information."</i></p> <p data-bbox="1039 687 1615 711"><i>"PMH can lead to bias but I think benefit far outweighs risk."</i></p> <p data-bbox="1039 719 1883 775"><i>"Less information is associated with significant risk. Even incomplete information might be put into context and be very valuable in patient care in ED."</i></p> <p data-bbox="1039 783 1682 807"><i>"I feel the errors would be worse by NOT knowing the information."</i></p>