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RESEARCH

Development of an electronic referral proforma from paramedics to general practitioners: A Delphi study

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Abstract

Introduction: Currently, non-transported patients who are attended to by a state-funded ambulance service in Victoria and are advised to visit their general practitioner (GP) do not have informational continuity of care, as there is no communication between the referring paramedic and GP. This research aimed to develop a functional electronic referral (e-referral) proforma from paramedics to GPs that can be used to support handover of patients' clinical information for non-transported patients.

Methods: Paramedics, GPs and digital health experts were invited to participate in the study. The study design utilised an online Delphi technique, where participants responded to three rounds of surveys relating to the pertinence, feasibility, content and presentation of an e-referral tool. Questions were open-ended or requested responses on a 5-point Likert scale.

Results: A total of 21 clinicians participated in the study and developed an e-referral proforma. After three rounds, participants agreed the proforma should contain the following information: the patients' identifying information, presenting complaint, social concerns, vital sign survey, management or advice given to the patient and reason for referral. Stakeholders stressed that the mode and timing of delivery must be flexible enough so that implementing the e-referral proforma does not become burdensome for clinicians.

Conclusion: A structured e-referral system between paramedics and GPs is feasible and offers a method to improve informational continuity of care and in turn, patient safety.

Keywords
handover; referral; electronic referral; pre-hospital; general practice

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INTRODUCTION

Accurate handover of patients' clinical information is essential in providing safe patient care.(1) In Australia, the paramedic's role is to provide immediate management for patients with acute or urgent illness, and then transport patients to an appropriate healthcare facility or provide referral and advice where transport is not necessary.(2) Often this process entails paramedics advising patients to follow up with their general practitioner (GP) for concerns that can be managed outside of the hospital setting. In Victoria, Australia, no written communication routinely occurs between the paramedic and the GP. As paramedics are largely unable to provide follow-up care for individual patients, it is advantageous that the patient's primary physician, their GP, is provided with accurate information regarding the ambulance attendance allowing the GP to informed follow-up care.

Sharing of electronic records is often used to facilitate the transfer of patients' clinical information between health professionals, and increases the accuracy of the handover in comparison to verbal or improvised methods.(3) Electronic records are currently shared between clinicians in hospitals and GPs to improve the quality of care delivered in these settings.(4–6) For instance, hospital clinicians share discharge summaries with GPs through electronic media.(7) Given that GPs are familiar with receiving patient information through electronic methods, this mode of information transfer may be suitable for information sharing between paramedics and GPs as well.

In Victoria, electronic patient care records (ePCRs) are currently written for each patient attended to by the ambulance service; however these records are not routinely electronically shared with other healthcare professionals as part of a handover process. At present, when a patient is transported by ambulance to a hospital, the patient's ePCR is printed at the hospital or sent electronically and given to emergency department (ED) staff to supplement the face-to-face handover. For the patients who are not transported to a hospital, there is no handover to the patient's care team at all, and the ePCR is not shared with any healthcare professional. Distributing an electronic referral (e-referral) created from the ePCR to the GP offers a potential solution to this gap in the chain of patient-centred communication.

Aims

The aim of this study was to develop a functional e-referral proforma that can be used to support clinical handover of non-transported patients from paramedics to GPs. The necessary characteristics of the e-referral proforma were feasibility for use in-field, and acceptability to both paramedics and GPs.

METHODS

Design

This study was completed with an electronic Delphi technique. The study involved three rounds of electronic surveys with 'group feedback' provided to all participants between rounds. The Delphi technique was chosen as it is a well-established methodology to gain consensus from expert opinions within healthcare research.(8–10) Ethical approval for this study was obtained from the Monash University Human Research Ethics Committee (HREC ID: 2019-16818-30584).

Participants

Purposive sampling was used to recruit participants. To ensure that participants had the skills and experience to act as an expert for this topic, participants were required to have at least 12 months' clinical experience in either their paramedic or GP role. There were no formal exclusion criteria. Attention was given to ensure diversity in metropolitan and rural locations for work, and years of clinical expertise. Participants were asked to use the Australian Bureau of Statistics' Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) map to determine the socio-economic status of their workplace for assistance with the development of a diverse expert panel. While there is no specified number of participants required for the Delphi technique, a 2011 systematic review reporting on 80 studies using Delphi techniques in healthcare revealed a median of 17 participants per study with an interquartile range (IQR) of 11–31.(8) Recruitment for our study was aimed at securing 20 participants, which was selected to allow diversity in sex, experience and geographical location.

All communication between the research team and participants was conducted via email. Key subject matter experts were approached directly including a member of the ambulance service executive team, a member of the ambulance service software team, a health department official and a digital health expert. Further clinical paramedic participants were invited by direct email based on random sampling of their employee identification number. Academic paramedics were invited via email distributed to all Monash University Paramedicine casual teaching staff. Email invitations were also sent to members of the Royal Australian College of General Practitioners (RACGP) e-Health Specific Interest Group with members of the Monash University Practice-Based Research Network strategically selected to ensure representation from geographic areas not otherwise represented.

Surveys

The surveys distributed to participants comprised a combination of open-ended survey questions, as well as closed-ended decision making questions. Questions were initially developed based on a previously completed systematic review by the authors and their combined experiences in paramedicine and general practice.(3) The initial survey was then pilot tested by 10 paramedics and GPs, who were not involved in the study as researchers or participants, for readability and content validity. Modifications were made based on pilot testing feedback. Each of the three rounds was open for three weeks, with a one-week break between surveys. Participants were provided with a summary of responses between each round.

Data collection

For the initial round, open-ended survey questions were used to gather background information about the perceived importance of implementing an e-referral proforma. Further rounds of the study were designed to refine the responses from the open-ended questions, to facilitate a consensus approach development of the e-referral proforma itself.

We evaluated the following aspects of an e-referral proforma:

1. Pertinence
   - Do GPs believe that receiving e-referrals would be beneficial to patient care?
   - Do paramedics believe that sending e-referrals to GPs would benefit patient care?
2. Feasibility
   - Would GPs take the time to read the e-referrals?
   - Do paramedics believe that sending e-referrals to GPs would be worthwhile?
   - Would GPs need extra training to interpret and utilise the e-referrals?
   - What effect would this have on paramedic workflow?
3. Content
   - What information should be contained within the e-referral?
   - What information should be excluded from the e-referral?
4. Presentation
   - How should the e-referral be shared?

- How long should the e-referral be?
- What timeframe should the e-referral be sent in?

Analysis approach

The analysis of question responses was dependent on the response's structure. Between the rounds, the surveys consisted of closed-ended binary and 5-point Likert scale questions as well as open-ended free-text questions. Binary responses were tallied using simple percentages, with >80% defined as consensus. For questions utilising a Likert scale response, consensus was defined as >80% agreement in the extreme two points on the Likert scale (ie, >80% 'agree' or 'strongly agree' OR >80% 'disagree' or 'strongly disagree').(8) Qualitative responses underwent inductive content analysis.

RESULTS

Participants

The number of clinicians recruited can be seen in Table 1. Demographic data for participants who consented but chose not to complete round one are unknown. Paramedic experience ranged from 1 to 23 years (median = 44; IQR: 2–16 years), with GP experience ranging from 1 to 33 years (median = 16; IQR: 8–20 years). Key subject matter experts' experience in their current role ranged from 2 to 20 years (median = 9; IQR: 2–20 years). Using the 2019 Monash Modified Model,(11) seven of the eight GPs identified their workplace as metropolitan, with one GP working in a rural location. Of the 10 paramedics, seven identified the branch where they most regularly started their shift as metropolitan, with three identified as rural.

Pertinence

Pertinence was assessed in the initial and final rounds. In round one of the survey, 87.5% (n = 7) of GPs believed their management of patients would be influenced by receiving an e-referral from a paramedic. When asked how their management would be influenced in a free-text response area, four of the GPs reported that they would ask their practice manager to request a follow-up appointment with the patient following notification that an ambulance had attended and not transported. Three GPs responded that the clear clinician–clinician communication was more likely to convey important information. Two GPs reported that awareness that the patient was requesting ambulances for non-urgent matters would alter their management. When asked, as a free-text question, who was most likely to benefit from an e-referral system from paramedics to GPs, eight respondents felt elderly patients are most likely to benefit from the referral, five reported all patients, four identified patients with chronic health conditions including mental illness or addictions, three each reported patients with a non-English speaking background, patients with cognitive delays or low health literacy and one reported patients with poor social or family networks.

To assess the current usage of written handover from paramedics to GPs, GPs were asked in round one approximately how many patients per month they see who have been advised by a paramedic to follow up with them; six selected '0–5', one selected '6–10', none selected '11–30' and one selected '31+'. When asked how often these patients currently present with written information provided by the paramedic, most GPs (75%, n = 6) said that their patients 'never' presented with written information provided by the paramedic.

It is important to note that in the initial round, respondents did raise a concern for the proportion of patients who do not have a regular GP. It was felt this would result in a cohort who would not benefit from the e-referral and therefore other options may need to be sourced for these patients.

To conclude the surveys in the final round, 14 of the 15 respondents believed that utilising the e-referral proforma proposed in this study is worthwhile. The participant, a GP, who voted 'no' stated '*email is an ineffective way of communication due to the plethora of dross that overloads the inbox*'.

Feasibility

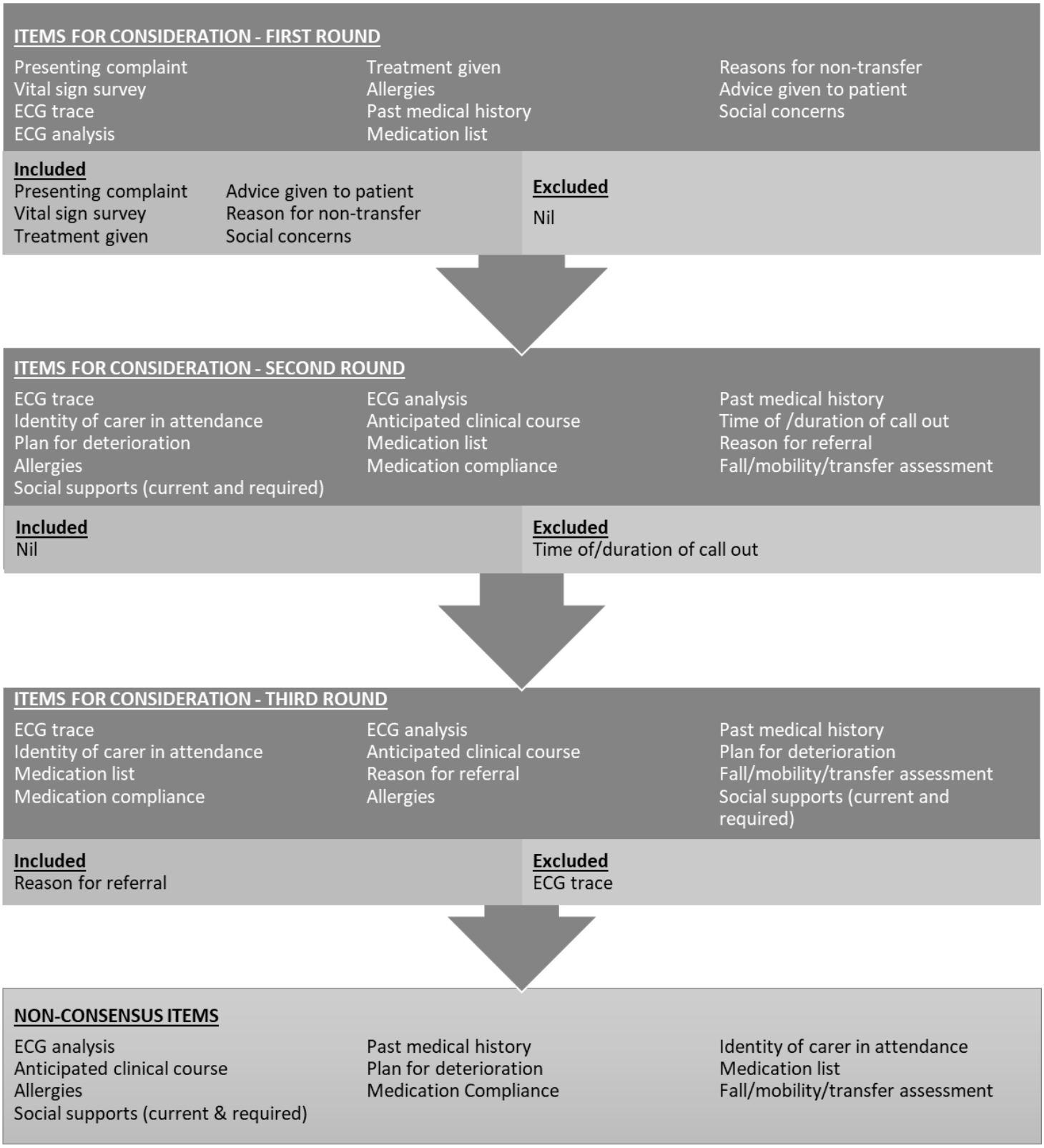
In round one, the majority (87.5%, n = 7) of GPs reported that they would have the time available to read an e-referral sent by paramedics. Similarly, all but one participant, a paramedic, indicated that the e-referral system would not unreasonably affect their workflow or workload (94%, n = 17).

When asked in round one what additional training they anticipated would be necessary to help them interpret an e-referral summary from paramedics, half of the GPs replied they would not need any additional training as they are already familiar with receiving correspondence from a range of health professionals. Other suggestions included a one-page summary including acronyms often utilised by paramedics, and some example e-referrals. As a follow-up in round two, GPs were asked if they would like to receive a one-page summary, example e-referral forms, or no training prior to the system going live, in a select-all-that-apply style question. No GPs selected the

Table 1. Number of clinicians who completed each survey round

	Contacted (n)	Consented (n)	Completed first round (n)	Completed second round (n)	Completed third round (n)
Paramedics	13	11	10	8	7
GPs	31	9	8	8	7
Key subject matter experts	5	3	3	1	1
Total	49	23	21	17	15

GPs: general practitioners



ECG: electrocardiogram.

Figure 1. Flow chart of content inclusion items over the Delphi rounds

Table 2. Participant preference for mode of delivery throughout each round

Options displayed	Round one (%)[a]	Round two (%)[b]	Round three (%)[b]
Paramedic uploads the e-referral to the patients' MyHealth record.	38	29	40
Sent by secure, encrypted email to GP (with an option to manually enter email address or select from a pre-defined list).	14	53	60
Paramedic uploads e-referral PDF onto a cloud service where a unique password is generated and given to the patient. Patient is then able to share that e-referral with their GP by providing the password.	10	Eliminated	Eliminated
Other (free-text entry).	38	N/A[c]	N/A[c]
Fax from paramedic branch to GP office.	N/A[c]	29	47
Secure messaging systems that integrate disparate information between clinical software and comply with HL7, the international standards for message sharing.	N/A[c]	24	47

GP: general practitioner; N/A: not applicable; [a]Percentage of votes; [b]Percentage of votes 'effective' or 'extremely effective' [a]Option not presented to participants in that round.

option of no training. Three of the eight GPs indicated they would like to view example e-referral forms and all GPs selected the one-page summary option.

Content

In round one of the surveys, participants were provided with a range of options based on the topics currently recorded in Ambulance Victoria ePCRs, as well as a free-text section for suggestions of new topics, which were added into the items for consideration in the following round. Figure 1 shows which items reached the > 80% consensus for inclusion over the three rounds: presenting complaint, vital sign survey, treatment given, advice given to patient, reason for non-transfer, social concerns, and reason for referral.

Presentation

How should the e-referral be shared?

Questions relating to mode of delivery remained contentious, with no consensus able to be gained. In the first round, participants were asked to choose between three suggested methods or suggest an alternate method. In subsequent rounds participants were asked to indicate on a 5-point Likert scale how effective they believed each method would be. Paramedics showed a clear preference for emailing an e-referral due to the difficulty of physically accessing fax machines during their shifts, while GPs insisted that faxing is the most dependable and practicable solution. In the final round the digital health expert reported that it is possible to email-to-fax documents remotely from the laptops paramedics have access to, with very little burden placed upon the paramedics themselves. Full results are shown in Table 2.

As the intended recipients of an e-referral tool, GPs were asked to indicate how likely they were to review an e-referral of various lengths. While the most common overall response was neutral, GPs indicated they are more likely to read e-referrals that are shorter in length. The results are displayed in full in Figure 2.

How soon after attending a patient should an e-referral be shared with the patient's GP?

In round one, all participants were asked to select when the e-referral should be shared from the paramedic to the GP from three options or enter free text with their own suggestion. In round two, the possible answers were amended to include the two most popular options from round one as well as the two most suggested responses within the free-text section. They were then asked to select how appropriate each option was on a 5-point Likert scale from 'unacceptable' to 'optimal'. The three most popular options were then presented to participants in round three with respondents asked to rate them as 'unacceptable', 'acceptable' or 'optimal'. As can be seen in Table 3, participants indicated that 'as soon as practically possible, within the same day' was the most optimal time frame.

Final proforma recommendations

The final proforma developed as a result of this research can be found in Supplementary Materials. The proforma includes the content items that reached consensus, as well as agreed presentation requirements in regard to length and time of referral submission.

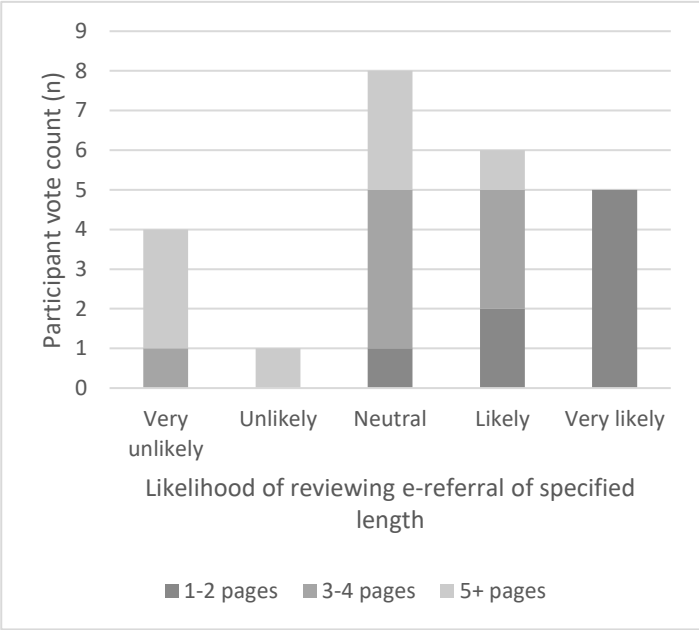


Figure 2. General practitioner preferred length of e-referral proforma

Table 3. When should the e-referral be sent from paramedic to GP?

Options available	Round one (%)[a]	Round two (%)[b]	Round three (%)[b]
Within an hour of patient contact	38	18	40
Prior to the paramedic leaving the scene	24	12	Eliminated
Within four hours of patient contact	14	Eliminated	Eliminated
As soon as practically possible, within the same day	N/A	35	80
Prior to the suggested time of GP follow-up	N/A	18	40

GP: general practitioner; N/A: not applicable; [a]Percentage of votes; [b]Percentage of votes 'optimal'

DISCUSSION

The aim of this project was to develop an e-referral proforma via a Delphi technique. With the input from paramedics, GPs and other key subject matter experts, a final proforma was developed that can be used to support handover of patients' clinical information for non-transported patients. Participants believed utilising the e-referral proforma proposed in this study is worthwhile and would not unreasonably affect their workflow or workload.

Pertinence

Despite GPs and paramedics recognising the value of communication between their respective professions, GPs and paramedics are not regularly communicating about their patients. Internationally, reported ambulance non-transport rates vary greatly from 3.7–93.7%, and between 2008 and 2015 Ambulance Victoria's non-transport rate was 23.2%.(12) This indicates a significant number of patients are currently being diverted away from hospital EDs. The Ambulance Victoria Best Care Framework specifies that one of their goals is 'connectedness' where 'everyone involved [is] on the same page with the care plan ... and kept in the information loop'.(13) The results of this study suggest that both GPs and paramedics believe e-referral of patients from paramedics to GPs will be valuable to improving the delivery of healthcare to patients, particularly vulnerable patient groups. In addition, communication between paramedics and GPs could influence patient management. There was some concern that a proforma such as that developed in this research, may not meet the needs of all in the community, as some people do not have a regular GP. While this will apply to some patients encountered, 97.5% of Australians over the age of 45 have a usual GP or usual place of care (14) and with no referral process currently in place, the proforma will provide a better process for a large proportion of the community.

Feasibility

The results of this study did suggest that the introduction of an e-referral between paramedics and GPs is feasible and would not greatly add to the workload of either clinical group. Although no research could be found investigating whether GPs do or do not have the capacity in their work day to read e-referrals, there has been some discussion suggesting the increase in electronic health records may actually add to the stress of a physician.(15) This discussion did suggest that physicians were more likely to report satisfaction with the electronic health record if it was brief and only contained essential clinical information. These findings are in line with our results for the e-referral, with participants suggesting that the brief e-referral would be feasible for their workload. Considering that most respondents affirmed that they would have the time and ability to participate in an e-referral process, and the large number of patients likely to be positively affected by this implementation, the operation of an e-referral process is both pertinent and feasible.

Presentation

The topic that remained the most contested between participants regarded mode of delivery. This research found that although paramedics preferred to email the e-referral, GPs preferred to receive the referral via fax. In 2018, a coronial report referred to faxing in the medical profession as an 'antiquated and unreliable means of communication' and recommended that faxing as a means of communicating should be phased out as a matter of priority.(16) Considering the move to digitalisation of healthcare with financial incentives such as the Practice Incentives Program eHealth Incentive easing the economic burden of practices engaging in this digital shift, the strong GP preference for fax was unexpected to the researchers.(17) The RACGP has recognised that despite 80% of surveyed GPs wanting to increase the number of letters they send and receive electronically, there are several barriers to moving from faxed referrals to e-referrals, pre-dominantly the lack of peers using e-referral systems, software flaws and privacy concerns.(18) These concerns were prevalent in the GP cohort engaged in this study. Within our study, and more broadly within healthcare, it is unclear how best to transition GPs from the familiarity of fax towards more modern communication methods without adversely impacting on patient care. The ability of the current ePCR system used by Ambulance Victoria to email-to-fax offers a potentially reasonable compromise for delivery of the e-referral that is portable for paramedics and allows GPs to receive the information in their preferred manner as an interim solution.

Content

The e-referral proforma designed in this study is a relevant and acceptable format that can be implemented to improve patient care. The researchers are unaware of any published collaborative research between paramedics and GPs regarding developing a referral system suitable for both clinicians prior to this paper. Substantially more literature exists evaluating hospital discharge summaries provided to GPs, including the National Guidelines for On-Screen Presentation of Discharge Summaries (NGOSPDS) published by the

Australian Commission on Safety and Quality in Health Care in 2017.(4,7,19–21) Our pilot tool would follow a similar layout to the NGOSPDS, with the allergies and medications sections omitted and recommendations for follow-up adapted to better align with paramedic practice as paramedics will not be recommending any changes to patient medications or diagnosing allergies, as these actions fall outside the paramedic scope of practice. The e-referral should contain the patients' identifying information, presenting complaint, social concerns, vital sign survey, any management or advice given to the patient and conclude with the reason for referral. It should be clearly stated if the choice of non-transport to ED was the patient's or the paramedic's recommendation.

Strengths

A considerable asset of this study is the recruitment of both the likely end-users of the proforma, as well as the policymakers within this domain. This allowed us to create a tool that combines the needs of the core stakeholders, hopefully increasing uptake through pro-active co-creation and designing our proforma within the limits of described organisational readiness.(22)

Limitations

Participants were provided with confidentiality of their responses, making it impossible to be sure that each participant in round three had participated in rounds one and two. It is unclear how it would affect the data if participant contamination has occurred, however a recent study investigating the effect of invitation approach on the response rate and final outcome of a Delphi survey affirmed that inviting panel members who missed a round to a subsequent round leads to a better representation of the originally invited panel without influencing the final outcome of the Delphi study.(23) An analysis of the subsequent round response-rates of 31 Delphi studies showed response rates varying between 45 and 100%, typically with retention of 80% or more participants per round, which aligns with our retention rates.(24)

Implications

This research has developed an e-referral proforma that has the potential to enable direct, asynchronous communication between paramedics and GPs, for patients not transferred by paramedics. By increasing communication between paramedics and GPs, greater cohesion between the two professions may be seen. While paramedics are well integrated into the space of emergency medicine, their increased role in the domain of general practice has not yet seen similar integration.

There is currently a sparsity of research regarding paramedic–GP communication which reflects a lack of real-life collaboration. GPs remain at the core of community healthcare, and as paramedicine continues to move further into the community healthcare space, it becomes increasingly vital that the paramedic and GP professions are more closely integrated. Our proforma offers a tool to support this ongoing relationship between the professions.

Involving GPs in discharging patients from hospitals has been shown to reduce a range of patient risks, most notably readmission.(25–30) It is hoped by the research team that actively involving GPs in the ongoing care of patients who present to paramedics and do not require hospital care at that time will reduce the ongoing risk of hospital admission for those patients.

CONCLUSION

As paramedic practice continues to overlap with primary healthcare, it is essential that patients who are not transported to EDs are provided with adequate follow-up from their GP. At present, there is no system in place to facilitate communication between paramedics and GPs to support this, and ad-hoc methods are relied upon. This research utilised stakeholders' knowledge and beliefs to develop a potential e-referral format that enables communication from paramedics to GPs to support informational continuity of care. Maintaining informational continuity of care is essential to providing safe and effective healthcare, and as such supporting this information transfer in a structured and feasible manner is proposed to improve patient safety.

COMPETING INTERESTS

The authors declare no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

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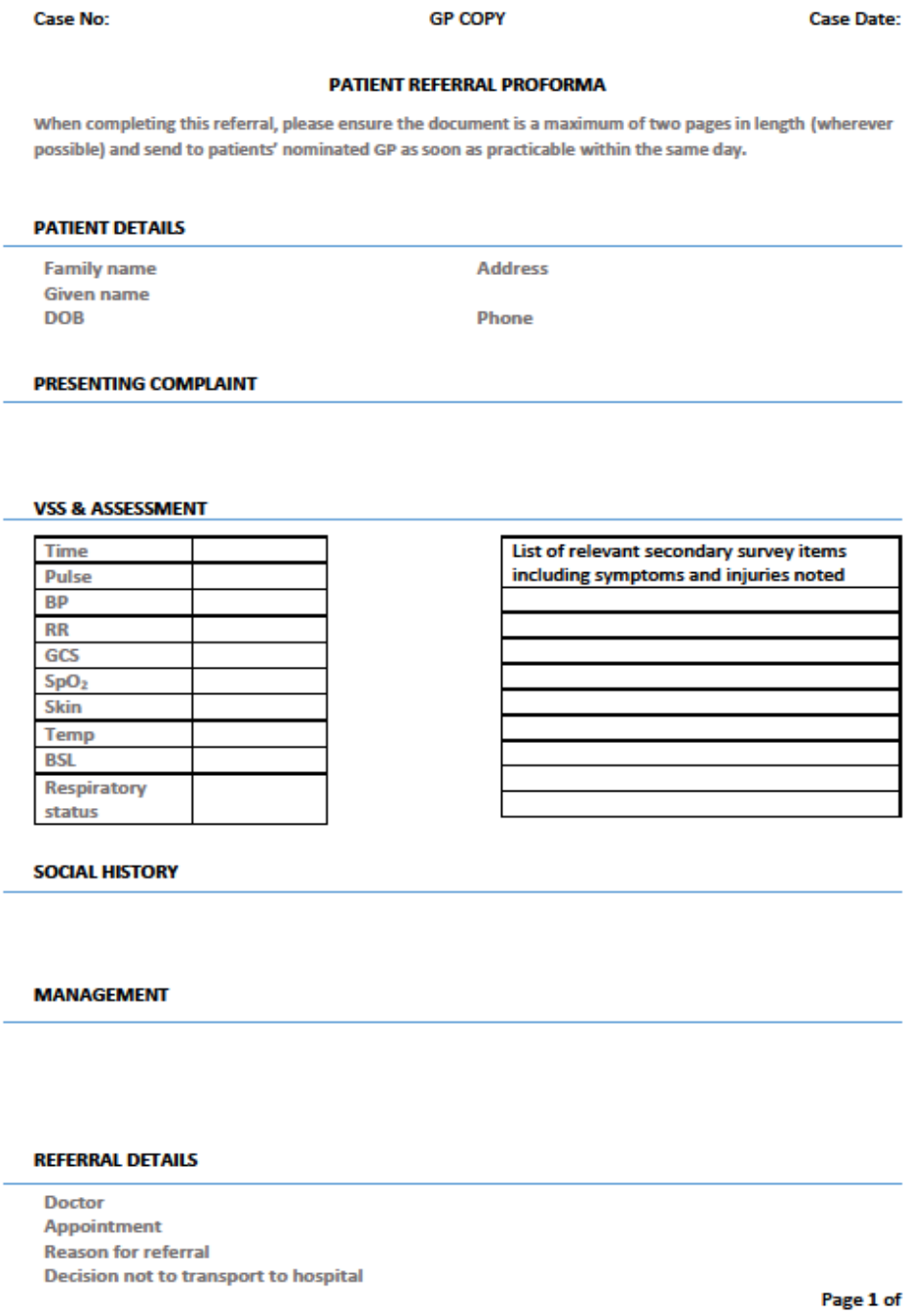
SUPPLEMENTARY MATERIALS



Case No: **GP COPY** **Case Date:**

PATIENT REFERRAL PROFORMA

When completing this referral, please ensure the document is a maximum of two pages in length (wherever possible) and send to patients' nominated GP as soon as practicable within the same day.

PATIENT DETAILS

Family name
Given name
DOB

Address

Phone

PRESENTING COMPLAINT

VSS & ASSESSMENT

Time	
Pulse	
BP	
RR	
GCS	
SpO_2	
Skin	
Temp	
BSL	
Respiratory status	

List of relevant secondary survey items including symptoms and injuries noted

SOCIAL HISTORY

MANAGEMENT

REFERRAL DETAILS

Doctor
Appointment
Reason for referral
Decision not to transport to hospital

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Figure S1. Suggested paramedic to general practitioner referral proforma