

# Clinical Performance Feedback to Paramedics: What They Receive and What They Need

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## ABSTRACT

**Objectives:** Performance feedback is not always well utilized in healthcare. To more effectively incorporate it, we used a discussion of current feedback systems to explore paramedics' perceived needs regarding feedback and to understand what feedback would improve their performance as healthcare providers.

**Methods:** We used a qualitative methodology with semistructured interviews of paramedics to explore perceptions and desires for feedback. Interpretive descriptive analysis was performed with continuous recruitment until thematic saturation was achieved. Themes were identified and a coding system was developed by two investigators separately and merged by consensus. The analysis was audited by a third investigator, and a member check was performed.

**Results:** Many different ideas were discussed that were analyzed to develop several major recurrent themes. One such theme was positive perception of feedback by paramedics. Despite the positive perceptions discussed, the shortcomings of current systems were also frequently discussed as were perceived barriers to receiving meaningful feedback. The idea of following up on patients' courses/outcomes also arose frequently during the interviews. In addition, feedback and its interaction with mental health emerged as a theme in terms of its potential for both positive and negative impact. Finally, suggestions about the future were also common with paramedics providing thoughts regarding what future systems could be developed or what changes could be made to provide them with meaningful feedback.

**Conclusions:** Our findings show how paramedics perceive feedback, but still note how barriers may impair its uptake and how it may affect their mental health. Our participants also made recommendations about what they would want to see in future feedback systems. This information can provide the foundation to improve current feedback systems or structure new ones to allow paramedics to continue to develop themselves as healthcare professionals.

Performance feedback on medical care and outcomes in prehospital care is generally infrequent and inconsistently delivered.<sup>1</sup> Research has also produced unreliable results regarding the value of feedback to health professionals—potentially reflecting the variation in content of feedback, the context of the feedback, and the mode of delivery.<sup>2–5</sup> This suggests that not all feedback is equal: not all feedback systems achieve their intended end of prompting performance improvement.<sup>6,7</sup> Some may point out systems-level changes (e.g., process improvement),<sup>3</sup> while others may not provide enough meaningful information to

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individuals so they may actually change their practice. Given the variable types of feedback systems, our team was interested in exploring our local paramedic feedback processes further to try to determine how to optimize it for maximal benefit.

Within the field of health professions education has a significant amount of literature on the topic of feedback. Much of this literature has surrounded the social phenomenon of feedback between teachers and learners.<sup>7,8</sup> Meanwhile in the quality improvement literature, there is a dominant discourse around data-driven feedback and audit systems where practicing individuals are simply provided information.<sup>3,5</sup>

Meanwhile in the prehospital literature, there are a few key studies on feedback systems, many of which echo the general trends in the general health professions and quality improvement literature. From chart review to resuscitation, feedback systems have shown some efficacy in changing behavior of practicing paramedics. O'Connor and Megargel<sup>10</sup> demonstrated improvement in the rate of appropriate endotracheal intubation documentation and unexplained delayed transport of a trauma patient was improved following the implementation of regular chart review feedback.<sup>9</sup> Successful reduction in contact-to-balloon times and improvements in prehospital stroke care<sup>11</sup> have been achieved through the use of feedback to healthcare providers. Feedback has also been shown to improvement in quality of management of cardiac arrest<sup>12</sup> and its components (e.g., cardiopulmonary resuscitation [CPR]<sup>13</sup>) with the implementation of performance feedback. Undoubtedly, provision of data to practicing paramedics in these targeted scenarios has resulted in measurable improvement in outcomes. However, the studies to date are still limited by viewing feedback as an *intervention*, rather than a complex social act<sup>7</sup> that requires the engagement of individuals to change.<sup>6</sup> Most data from these randomized controlled trials or postimplementation trials, however, do very little to clarify *how* these systems work; they simply show *that* they work.

Within health professions education it is important for us to understand the complexities of various practicing learner populations so we may better design and implement systems and supports to encourage continued learning. While the literature suggests that there are several successful uses of feedback to improve performance, there are few studies that clarify the role and function of various types of feedback in prehospital care. Within health professions education, there has been a push for more clarification studies (i.e., studies that explore the

*whys* and *hows* of various educational interventions)<sup>14</sup> but also more replication studies.<sup>15</sup> As such, we have engaged paramedics in a discussion of clinical feedback as a concept, using the formal feedback programs in place as a prompt to determine transferrable principles for the content included in feedback systems. The purpose of this study was twofold: first, we sought to explore paramedics' perceived needs regarding feedback, and second, we sought to understand what feedback they felt would improve their performance as healthcare providers.

## METHODS

We conducted a qualitative study examining paramedics' perceptions around clinical feedback. Our population of interest was paramedics who were employed within the Niagara region. This study was approved by the Hamilton Integrated Research Ethics Board. We used the Standard for Reporting Qualitative Research guidelines.<sup>16</sup>

### Setting

For our study, we used paramedics actively practicing within the Niagara region. The region sees 54,000 patient contacts each year and covers a population of 427,421 residents over a 1,850-square-kilometer area between Lake Ontario and Lake Erie. The paramedic group consists of 324 paramedics, including 138 advanced care paramedics and 186 primary care paramedics. This population was chosen because of the formal Strategic Management of Acute Reperfusion and Therapies in Acute Myocardial Infarction (SMART-AMI)<sup>17</sup> feedback system and CPR feedback systems, which already existed in that region. The SMART-AMI feedback form is described in the Appendix 1. These two systems results in feedback reports that are returned to the paramedics involved providing information such as the date and location of the call, the patient demographics, performance regarding critical management steps (e.g., time to electrocardiograph [ECG] for SMART-AMI), CPR performance metrics (e.g., chest compression depth and frequency or total duration with and without CPR during a cardiac arrest), diagnostic test results (e.g., cardiac catheterization findings), important subsequent management steps (e.g., stent placement), and patient disposition (e.g., admitted to coronary care unit).

### Data Collection and Interviews

Participants were contacted via e-mail and involvement in the study was on a volunteer basis. Prior to

initiating interviews, we piloted the interview questions with paramedic educators to ensure the rigor of our discussion prompts. Subsequently, two members of the research team (LM, LC) were trained to conduct interviews, using the semistructured interview script found in Appendix 2. Questions within the interview guide probed information about basic demographics, the SMART-AMI formal feedback system (and its perceived usefulness), informal feedback, other sources of feedback, and perceptions of feedback. During these semistructured interviews, we used both scripted and unscripted follow-up questions to further explore and ensure clarity around new ideas.

All participants in our study provided informed, written consent. To limit perceived risk for paramedics, members of the team (LM, LC) who were not part of the medical oversight structure were involved with conducting interviews. Investigators with a supervisory role for paramedics (TC, MW) were kept at a distance from the interview process and were not privy to the paramedics' identities. All interviews were recorded and transcribed, and the participants' identities were redacted before carrying out the analysis.

### Data Analysis

An interpretative descriptive technique was used, with influences from phenomenology, to analyze each transcript.<sup>18</sup> A set of four transcripts of the source material were analyzed by two reviewers (LM, LC). The transcripts were analyzed by each investigator with an independent, open-coding approach and then the separate codes were compared and a consensus-building process was used to generate a single list of codes. Any disagreements were discussed and resolved with the aid of a third investigator (TC). From that point forward, the remaining transcripts were analyzed separately by the same two investigators and discussed periodically to develop new codes. The reviewers met frequently to discuss the analysis and to merge common codes, as well as to discuss any new codes that emerged during independent analysis. Transcripts were analyzed until saturation was reached, which was defined as the point where no new codes emerged from the transcripts during analysis. Finally, the investigators merged their analysis and generated a thematic framework. Prior to final analysis, the thematic framework was sent to the paramedics who participated in the study (i.e., a member check), to ensure the credibility of the data analysis.

### Analytic Team

The primary investigator for this study (LM) is a senior emergency medicine resident and was directly involved in study design, data collection, analysis, and interpretation. The second data analyst (LC) is a senior medical student with an interest in emergency medicine who was involved in data collection, analysis, and interpretation. These two analysts (LM, LC) were trained by the senior author (TC) of this paper. MW is an attending emergency physician and medical director for the Hamilton Health Sciences Centre for Paramedic Education & Research. She assisted with study design and review of the paper. TC is an attending emergency physician with qualitative research experience and multiple degrees in education and participated in study design, analysis, and interpretation. The paramedic group participating in the study generally practices in a different region from the investigators; therefore, with the exception of MW, the investigators did not have a preexisting relationship with the paramedics. For this reason MW was not directly involved with data collection or analysis.

### Statement on Analytic Team's Stance

We acknowledge a preexisting interest and positive perception of feedback as an important tool for professional development, which certainly contributed to our study concept and had the potential to affect our interpretation of the data to give a more favorable impression of the benefits of feedback or to minimize its negative aspects or shortcomings.

## RESULTS

A total of 12 paramedics were interviewed regarding feedback. Their interviews lasted between 12:18 and 57:28 minutes. The demographics of the interviewees are described in Table 1.

**Table 1**  
Characteristics of Participating Paramedics

Sex	Male	42% ( <i>n</i> = 5)
	Female	58% ( <i>n</i> = 7)
Training level	Advanced care	75% ( <i>n</i> = 9)
	Primary care	25% ( <i>n</i> = 3)
Age (y), mean (range)	38.6 (25–53)	
Years of experience, mean (range)	14.4 (1–27)	
Duration of interviews (min)	26:39 (range = 12:1–57:28)	
The total number of participants was 12.		

**Table 2**  
Themes and Subthemes From Our Analysis

Theme	Subtheme
Paramedics' positive perception of feedback	Asking for feedback Desire for feedback Strengths of current systems Adaptive informal feedback structures
Limitations of current feedback systems	Lack of routine feedback Lack of feedback structure Formal feedback and discipline integrated Biases in feedback received Questionable value of feedback received
Perceived barriers to feedback	Confidentiality Practical limitations Social barriers
Following up on patients' clinical course or outcome	Desire for case-specific feedback Desire for greater insight into the diagnosis Desire for knowledge of outcomes
Feedback and the mental health of paramedics	Feedback positively affecting paramedic mental health Potential for negative impact Resilience
Suggestions and considerations for the future	Specific requests for feedback Culture shift

We identified six major themes including a number of subthemes, which are outlined in Table 2 with supporting quotations from the interview transcripts. The major themes included paramedics positive perception of feedback, limitations of current feedback systems, perceived barriers to feedback, following up on patients' clinical course/outcome, feedback and the mental health of paramedics, and suggestions and considerations for the future. Following our thematic analysis, an e-mail was sent to all participating paramedics to perform a member check. No further suggestions or changes were made; however, paramedics expressed gratitude for the study being performed.

**Paramedics' Positive Perceptions of Feedback**

The participants repeatedly expressed a positive perception on feedback. These expressions could be organized into several subthemes: 1) asking for feedback, 2) desire for feedback, 3) strengths of current feedback systems, and 4) adaptive informal feedback structures.

Asking for feedback included paramedics describing the sources and types of feedback they actively sought out. One participant (Paramedic 1) stated: "When you have the supervisor with us, I will often ask him: 'Hey what did you think of that? Like, how did that call go down?'"

Desire for feedback arose from paramedic expressions of wanting more feedback from various sources, frustration with the current lack of feedback, interest in discussing patient care, and desire for involvement in feedback systems. This theme is best highlighted by the following quote:

So, without feedback a lot of times our job ends when we roll through the emerg[ency department] doors and transfer care but we often don't get to the results or the outcomes of the patient or the diagnosis on discharge and so if we had that it would validate what our working diagnosis is in the prehospital setting. (Paramedic 2)

They highlighted a number of key strengths to their current feedback mechanisms and system. For example, feedback was seen as achieving practice change, encouraging continuing education and valuable as an educational tool. Another paramedic participant (Paramedic 3) stated:

... [the SMART-AMI feedback report] improves my buy-in and it keeps me passionate, and if it turns out that I did something and it wasn't accurate, like if I didn't think it was a STEMI and it turned out to be one, it is going to improve my clinical skills and I'm going to go back and review Twelve Leads or whatever it is going to be. It continues my education; it keeps me sharp and relearning and stuff that I screw up on.

Other specific components of the current systems mentioned in a positive light were the inclusion of times and visual aids.

Finally, from our interviews it seems apparent that adaptive informal structures have emerged to augment formal feedback structures. One paramedic (Participant 3) stated: "Absolutely. I would say that the informal feedback changes [my practice] a lot more than the formal because the formal is few and far between." Other examples of this include the frequent occurrence of informal feedback, peer discussion of feedback received, and the voluntary self-reporting of errors.

Of note our participants generally started their discussions elaborating on how feedback was useful or a positive experience, displaying that that paramedics perceived feedback positively. Interestingly, although they reported that they saw that feedback was a

positive phenomenon, other themes revealed that feedback was not always viewed in such a positive light.

### Limitations of Current Feedback Systems

Despite the positive aspects of the current feedback systems as described above, several limitations arose as another theme in our analysis. These limitations were issues paramedics raised about the feedback they currently receive. They could be grouped into a few sub-themes: 1) lack of routine feedback, 2) lack of feedback structure, 3) integration of feedback and disciplinary action, 4) bias in feedback received, and 5) questionable value of feedback received.

Lack of feedback was viewed as frustrating. One participant aptly stated:

I think it is one barrier that is present in our system that can improve our prehospital care and our management if we had some more feedback systems for sure because there is few and far between . . . (Participant 11)

Some paramedics pointed out that the feedback they currently receive was infrequent and the quality of the feedback was also inconsistent. Participant 11 stated: “And then you do receive some feedback afterwards from either other paramedics like and ORNGE [flight paramedic] crew for example that comes in to transfer a patient out or a doctor or a nurse, but it is very informal and inconsistent I would say.”

One of the problems that the paramedics cited about their current work environment was the tie between formal feedback systems and disciplinary action. As this quote by Participant 7 shows, there is a perception that feedback is mainly driven by complaints or need for disciplinary action: “I have just kind of heard it through the grapevine if there has been patient complaints or family complaints, you’re contacted, they do like an investigation and then they decide if you need remediation of some sort.” Tied to this was a perception of a bias within the system toward negative feedback. Interviewees perceived that the system seemed skewed toward negative feedback and perceived that there was a lack of positive feedback. Participant 7 highlighted this point well: “I would say that the only time we get feedback about our calls is if there’s anything negative. We are told if we make an error, if we didn’t notice . . .”

The comments made surrounding the questionable value of the feedback delivered also suggested potential problems with the current systems. Paramedics suggested that feedback was of limited value if it was believed to have a medicolegal or nonmedical focus, if the feedback source was not seen as credible, or if they had the impression that the feedback was an exceptional circumstance and not representative of their usual practice. An interviewee summarized this perception well:

On our formal feedback it can be a lot of the time it’s just again like the legal nitpicky thing it is not something that is going to help me improve in the future. . . . I’m just going to write more on my form next time. (Participant 1)

In addition, paramedic statements regarding feedback not achieving practice change or feedback being ignored raised the question of the true value of the current feedback systems.

### Perceived Barriers to Feedback

Perceived barriers to receiving feedback was another major theme that arose from our analysis. Paramedics perceived several factors that they felt restricted the feedback delivery. These barriers were grouped into three major subthemes: 1) confidentiality, 2) practical limitations, and 3) social barriers.

Many participants mentioned confidentiality as the reason they were not able to obtain feedback regarding specific patient outcomes or management (i.e., they are not considered part of the circle of care after patients are admitted to hospital). One person (Participant 2) stated: “. . . [C]onfidentiality is huge now. And people—nurses . . . are very reluctant to give out information whereas before it was quite easy to discuss and that was a great source of learning but now it is somewhat difficult.”

Practical barriers referred to those issues that were more concrete, such as additional workload or time required to implement a feedback program, the lack of availability of a feedback provider, and paramedic uncertainty about who to seek out as a source of useful feedback. Participant 11 noted: “. . . most of the time they are busy, we are busy and there is not much time for feedback from the docs to us.”

Social barriers referred more to the psychosocial or cultural factors that could hinder feedback delivery. Examples of these barriers include personal discomfort

with criticism, reluctance to provide peer feedback, incorporation of discipline with feedback, resistance to discussing errors, and variability in paramedic receptivity to feedback.

### Following Up on Patients' Clinical Course or Outcome

The strong desire to know the outcomes for their patients was one of the more interesting themes that emerged during the analysis. Many of the participants spontaneously expressed their pronounced interest in learning about the clinical course of their patients after their arrival at the hospital. This theme also developed from several related subthemes: 1) desire for feedback specific to patient cases, 2) desire for greater insight into the ultimate diagnosis, and 3) desire for knowledge of patient outcome.

The desire for feedback specific to a case included interest in receiving feedback specific to the management of a particular patient as well as the desire to have feedback on their clinical decision making. Participant 11 stated: "I think we should probably have more feedback systems in place because that is only one of the best ways to improve clinical judgment . . ." Other paramedics expressed the desire to know patient diagnosis, but more participants also displayed interest the patient's overall clinical picture and outcome. For example:

What I am more interested in is knowing, "okay I got them to the hospital, did they live?" Like, I don't know, I have no idea! . . . I get them there and maybe we have a [return of spontaneous circulation (ROSC)] and then, they have a ROSC at the hospital say, but then after we leave I don't know. Like did they walk out of the hospital or did they die later. So I don't know. And I would like to know. (Participant 5)

Furthermore, our analysis revealed that this desire for knowledge was associated with a perception that confidentiality concerns acted as a barrier to gain this type of feedback.

### Feedback and the Mental Health of Paramedics

There were a number of emergent themes from our data that arose in a spontaneous manner, and most of these themes revolved around the psychological impact of feedback. Paramedic mental health was referenced

frequently, in both positive and negative terms. Components discussed included: 1) feedback positively affecting paramedic mental health, 2) the potential for feedback to cause a negative impact on mental health, and 3) resilience.

The positive impact of feedback was described in terms of its potential to improve job satisfaction, confidence, and motivation and to build morale in paramedics. One person stated:

I think so because it again makes you feel good, it lifts your spirits. Yes, so you are not just wondering around curious all of the time what ever happened to that patient, once again, did I do the right thing? So yes I think it makes you a better paramedic. (Participant 8)

The concerns regarding negative impact centered around negative emotions in discussing errors, such as fear and shame and concern for detrimental effect on ego and well-being when negative feedback is delivered. Our interviewees also brought up the need for careful delivery of such feedback. Participant 12 stated: "I have only ever gotten positive feedback so that's great but if I were to receive negative feedback I might beat myself up a little bit about it."

The related theme of resilience emerged from our data as well. Our interviewees expressed several opinions about variation between paramedics in their resilience to feedback. One more experienced paramedic (Participant 2) stated: "If any negative feedback comes my way I don't . . . I am too old to get down on myself about it. I just learn from it." However, despite frequent references to age or experience no consistent opinion was expressed in terms of the impact of these factors on resilience in paramedics. Regardless, paramedics perceive that feedback has the possibility of impacting their overall mental health because of its impact on their perceptions of themselves (e.g., questioning their self-efficacy).

### Suggestions and Considerations for the Future

Several insights were also provided by paramedics regarding future directions for feedback. The paramedics gave several suggestions regarding what they would like to see in future feedback programs. They called for feedback that was targeted for specific call types (such as geriatric, pediatric, stroke, trauma, dyspnea, and high-acuity calls). One paramedic (Participant

9) yearned for feedback especially around elderly patients: “[T]hese medical, older patients that just aren’t presenting with the black and white [diagnoses]; it would be interesting to give me feedback and more lab results . . . and trauma patients too. How did they make out?” Suggestions were also made to allow paramedics to be able to trigger feedback about specific calls.

Additionally, participants alluded to a culture shift that has been occurring in the paramedic work environment. One insightful paramedic (Participant 1) noted: “I don’t know if it is because of that specific feedback tool, but in general, the culture has been more accepting of talking about mistakes. I think there is still some hesitation with talking about it, but it is improving.” Specifically, the paramedics noted that there has been a culture shift toward accepting feedback, increased willingness of paramedics to discuss errors, and increased emphasis on patient confidentiality after transfer of care.

## DISCUSSION

With feedback we hope to empower paramedics to make positive changes to their practice. The paradigm of informed self-assessment<sup>8,19,20</sup> suggests that practicing individuals require external information to assist them in improving practice, since self-assessment alone has been shown to be ineffective.<sup>21</sup> As such, the ability to monitor and improve their performance would support paramedics to continue being dedicated health-care professionals seeking to provide the best patient care.

We uncovered many insights and opinions about paramedics’ perceptions of feedback. By using a qualitative approach, our results contribute a perspective that has yet to be well described within the literature, one that can hopefully be considered in a broad range of situations to improve the process of feedback for paramedics. This offers a contrast to the previous body of literature regarding feedback in emergency medical services (EMS), which has generally been more narrow in scope.<sup>9,10,12,13,22</sup> Our study also serves as clarification study,<sup>14</sup> allowing those in the paramedic education field to more deeply understand theoretically based concepts via the lens of our local experience. From the results of our study, we suggest that prehospital educators consider the following when improving their feedback systems.

Specifically, we have four considerations that paramedic educators should bear in mind when examining how they can best support their colleagues in performance improvement and maintenance of competence:

1. Paramedics will find a way to get feedback, one way or another.
2. Formal feedback systems: a chance to overcome systematic barriers.
3. Feedback systems should be augmented with care and compassion.
4. A feedback culture is imperative.

### Paramedics Will Find a Way to Get Feedback, One Way or Another

The insight into paramedics’ perspectives of current systems, their requests for future feedback systems, and their desire to know patients’ outcomes may help to provide guidance in improving feedback systems or developing new ones. As opposed to physicians, nurses, and trainees within a hospital system, prehospital personnel are not always privy to outcomes feedback, and our results show that they are utilizing their informal networks to overcome this systematic barrier.

The adaptive, informal structures that have evolved around formal feedback structures also raise a few points for further consideration. We felt that the presence of these informal systems suggests a current lack of adequate feedback and a desire for feedback that extends beyond what is currently received, resulting in paramedics developing other ways to meet these needs. Examples of this included the frequent occurrence of informal feedback including from peers, patients, families and hospital staff, peer discussion of feedback received, and the voluntary self-reporting of errors. While it is possible, or even likely, that much of this informal discussion would still occur even with an optimized formal feedback system, we feel that its presence supports the idea that paramedics highly value feedback about their performance and should be supported by both administrative and educational systems to acquire such data.

### Formal Feedback Systems: A Chance to Overcome Systematic Barriers

We detected an interesting conflict arising between paramedics’ desire for knowledge of patient outcomes and the increasing need for patient confidentiality. In general paramedics understood need to protect patient confidentiality, but still felt that this was a barrier to attaining practice-changing information. We feel this

tension is particularly worth discussing due to its potential widespread impact on the nature and availability of paramedic feedback. This may be a barrier that warrants policy revisions, as the literature continues to show that feedback to paramedics can prompt performance improvement.

More effective feedback systems could systematically overcome policy and bureaucratic barriers and ideally allow for greater quality improvement by enabling paramedics to reflect more regularly on their own practice with the benefit of external perspective. We believe that this is critical given previous work that has shown the significant limitations of self-assessment alone.<sup>6,21,23</sup>

### **Feedback Systems Should Be Augmented With Care and Compassion**

Other themes that arose, such as perceived barriers to feedback and its impact on the mental health of paramedics, may help to address some of the other issues that relate to the practical implementation of feedback systems and their role within a functioning prehospital care system. Specifically, our findings align with previous literature, which warns against negative, self-threatening feedback.<sup>6,7</sup> While our analysis demonstrated that paramedics readily reported their positive perception of feedback, unfortunately this may not directly translate to a receptiveness and performance improvement when feedback is actually delivered.<sup>6,7</sup> Educators training paramedics should consider our findings when they think about how they might enhance formal feedback or disciplinary review systems to optimize performance improvement.

The complex interplay suggested by our paramedics between mental health and feedback is also an important point to highlight. In light of the increasing evidence of stress and burnout within the ranks of our prehospital healthcare providers,<sup>24–27</sup> paramedic administrators and educators should take heed to the themes we noted about feedback's impact on mental health.

Paramedics cited numerous potential impacts, both positive and negative, that warrant attention and consideration in any developing feedback system. As previously demonstrated in the literature, the delivery of the feedback itself can influence the individual's feelings, subsequent interpersonal relations, and their approach to future work.<sup>28</sup>

### **A Feedback Culture Is Imperative**

Paramedics alluded to a culture shift occurring over time resulting in improved perception of feedback,

increased willingness to discuss errors, and increased emphasis on patient confidentiality after transfer of care. Culture shift may continue to impact any developing feedback systems and suggests the need for continued evaluation and adjustment of any system as the environment the feedback occurs in continues to evolve. While such culture shifts around feedback do not tend to happen overnight, it is possible to create a more robust feedback culture with more consistent feedback systems.<sup>29,30</sup> Increasing the frequency of feedback (i.e., not simply providing negative feedback via disciplinary reviews) and decreasing barriers to receiving performance data can help to shift this culture.<sup>30</sup>

### **LIMITATIONS**

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In terms of limitations, our study was limited to a single EMS system that already has a handful of formal feedback programs in place, which may limit the transferability. Our paramedic interviewees were a convenience sample, which may have resulted in results not representative of the entire paramedic population. In addition, paramedics who volunteered to participate in a study regarding feedback may differ from those who did/would not, particularly in regard to learning styles and response to feedback. There was, however, representation from both male and female as well as primary and advanced care paramedics with a wide range of ages and years in practice. We stopped recruiting paramedics following saturation; however, this resulted in only 12 interviewees. Despite reaching what we perceived as a saturation or sufficiency point, it is possible the small sample size led to incomplete data. As well, we primarily relied upon interviews as a single source of our data, which is a limitation to our study design. Despite the limitations above, we feel that the results are transferable given the diversity in the participants within the region in terms of sex, age, experience, and training level. This study introduces a new perspective on feedback in prehospital care by using a qualitative approach to better understand paramedics' perceptions of feedback and gain their insights into what feedback they feel would help them to develop and improve their performance as healthcare providers.

### **CONCLUSION**

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Our findings demonstrate a generally positive perception of feedback by paramedics, but with insight into the difficulties with its practical application and



limitations. These results can provide valuable information to improve current feedback systems or structure new ones to allow paramedics to continue to develop themselves as healthcare professionals. The analysis also raised interesting related issues including the interactions of feedback and mental health and of patient confidentiality and paramedic feedback. These issues are important factors to address when considering the future of paramedic feedback and its implications.

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14. Cardiac intervention (e.g., stents placed)
15. Patient disposition (e.g., patient was transferred to the coronary care unit for further care)
16. Pre-PCI ECG
17. ED ECG
18. Pre-PCI coronary catheterization fluoroscopy still
19. Post-PCI coronary catheterization fluoroscopy still

## Appendix 1

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### Items Contained In The Smart-Ami Feedback Form

1. Date of event
2. Hospital of presentation
3. Patient demographics
  - a. Initials
  - b. Age
  - c. Identification number
4. Reason for referral (e.g., primary percutaneous coronary intervention [PCI])
5. Actual procedure performed (e.g., primary PCI or thrombolysis)
6. Location of infarct
7. Severity as measured by Killip class
8. Patient presentation (e.g., arrived by EMS)
9. Paramedic service
10. First ECG done in ambulance? (yes/no)
11. Actual time stamps as compared to achievable benchmark for the following time spans:
  - a. ED arrival to first ECG
  - b. ED arrival/diagnostic ECG to hotline
  - c. Hotline call to HIU arrival
  - d. HIU arrival to first balloon inflation
12. Additional comments describing particular situation
13. Coronary anatomy description (e.g., 99% stenosis of circumflex artery)

## Appendix 2

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### Prompts For Our Semistructured Interview With Paramedics

#### Demographics

Age:

Primary or Advanced Care Paramedic:

Years of practice:

#### Questions/Probes

##### SMART-AMI Specific

Do you find the SMART-AMI program useful?

Are you more aware of time to ECG and definitive care in STEMI now?

Does it change what you do on those calls?

Is there any other information you want fed back after a STEMI?

Have you noticed any other changes since SMART-AMI started other than in time to cath lab?

Do you think the program has resulted in better care for these patients?

##### Unstructured (Informal) Feedback

Aside from the SMART-AMI program, do you get feedback about your calls?

How often?

From who?

Who initiates it (you or the feedback source)?

When (immediate or delayed)?

Is it constructive/helpful?

Does it change what you do?

Do you think it makes you a better paramedic?

##### Other Feedback

Would you want a similar system set up to the SMART-AMI program for other patient situations/complaints?

What would you keep?

What would you change?

How do you want to get the information?

What else do you want to know?

Who do you want feedback from?

What is more helpful: case specific feedback or feedback accumulated over a few months?

Does it matter to you if it also gets seen by your supervisors or admin?

*Perceptions*

How do you see feedback?

How do you think other paramedics see it?

Are mistakes or negative feedback something that you can talk about with each other?

*Final Thoughts*

If we were to design a new feedback system for EMS, is there anything else you want us to know or any ideas about what would be useful?