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Research

An inter-agency expert panel's prioritisation of clinical quality improvement topics in a paramedic system

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Abstract

Introduction
Quality improvement (QI) programs have become common in paramedic systems, but they are often limited to individual agencies. Modern paramedicine involves many different agencies and inter-agency QI programs would better reflect their co-operative efforts. Similarly, inter-agency use of clinical outcome measurements can offer system level performance data. This study's intent was to explore the feasibility of planning an inter-agency QI program that uses outcome measures.

Methods
This study used a modified Delphi methodology. A 49-member panel of inter-agency representatives was convened to identify and prioritise clinical outcome-based topics. Over a 3-month period, two online surveys were conducted followed by a 1-day face-to-face meeting.

Results
The study demonstrated very high participation rates. Results progressed from an initial wide range of 38 topics to a final consensus of two: infection/sepsis and patient safety/care pathways, complete with outcome measures.

Conclusion
Inter-agency quality improvement planning is an under investigated area, but this study demonstrates that it is feasible. Additionally, this planning can incorporate clinical outcome measures that inform system level discussions about quality. Other paramedic agencies may draw on the study's processes when planning their own quality improvement programs.

Keywords:
EMS; quality improvement; outcome based; Delphi

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Introduction

Improving the quality of patient care has been recognised as an important responsibility of paramedic systems for some time (1) and continues to receive significant research attention (2-5). Acceptance of this responsibility is demonstrated by the many formal quality improvement programs that have been implemented in these systems (6). However, these same data show that there is wide variability in these programs and most appear to be limited to individual organisations (6).

Modern healthcare is complex (7), and this clearly holds true in paramedicine where its systems involve many inter-related organisations. Many systems use separate agencies for operating ambulance services, providing medical direction and oversight, and establishing regulatory frameworks. Because the quality of patient care is dependent on co-operation between these agencies, leadership in emergency services has recommended that they work together on quality improvement initiatives (8,9). There is however, little research that focusses on programs that are inter-agency in nature. Some literature on agency collaborations does exist, but even these authors note that literature on them is rare (10). While admittedly absence of evidence is not evidence of absence (11), it is also true that no single agency can meet all of a patient's needs (12), and so it does appear that in paramedicine, there is a need for more investigation into the inter-agency aspects of quality improvement programing.

One of the strengths of quality improvement programs is that they can incorporate clinical outcomes on a system level. This approach is an important advance over their precursor, 'quality assurance' programs that limit their attention to individual provider's compliance with protocols and procedures.

We report on a project from Ontario, Canada that is both inter-agency and outcome based. This approach had not been used before in our jurisdiction and resources were limited. To build consensus and ensure resources were used judiciously, we used expert opinion to systematically identify high priority clinical topics and outcomes. This was an initial and essential step in the planning process (13,14).

In our jurisdiction, a large part of the assessment of paramedic care is provided by regional base hospitals (RBHs). Over a 3-month period, three RBHs convened a panel of inter-agency representatives. To convey a sense of scale, it is worth noting that the total number of paramedics affiliated with these centers is approximately 6000.

Aim

Our aim was to have inter-agency representatives use their professional opinions to systematically identify and prioritise clinical quality improvement topics with measureable patient outcomes resulting from the paramedical encounter.

Methods

Study design

We chose a Delphi (modified) study method. Readers will recall that these techniques were originally developed in the 1950s to obtain a consensus among experts when it is impractical to convene face-to-face meetings (15). These studies rely on a basic assumption that structured group thinking about complex problems is superior to individual opinion, particularly when the evidence to support solutions to problems is incomplete or has a significant level of uncertainty (16,17). This fit with our study context, because participants were located significant distances apart and there was uncertainty about the feasibility of the project (as neither the inter-agency approach nor outcome measures had been used before in our jurisdiction). Additionally, using Delphi techniques to prioritise has become common in healthcare research (18).

The exploratory nature of the study context was an important consideration in deciding how the consensus on priorities would be defined. As described by Diamond et al (19), Delphi's are used in such a wide range of topics and contexts that many different criteria can be used. Describing criteria apriori assists others in replicating studies, and so in our context we specified that proportionally based ranking would indicate consensus.

Participants

We began by establishing a steering committee to oversee the project. The committee comprised of program managers from each of the three RBHs as well as a project facilitator and resource personnel. The role of the committee was to direct and monitor the study's progress, validate submissions and respond to implementation issues. To form the expert panel, the RBHs used existing email databases to broadcast requests for voluntary consent to various system stakeholders in each location. A written overview of the project was provided as well as an assurance that all online activity would be anonymous and participants could withdraw at any time. The recipients were RBH emergency physicians; RBH managerial, instructional and quality assurance staff; frontline paramedics; ambulance service managers; and system regulators. Watson (19) describes this initial invitation as a preliminary step to identify those who are willing to commit for the duration of a Delphi study. The committee established inclusion criteria for participating as having managerial, paramedic or physician credentials, and be currently working in a paramedical capacity.

Procedures

Round one

Those who responded to the invitation were asked to list (using SurveyMonkey) their opinions of three high priority clinical topics and associated measureable clinical outcomes. To focus their submissions, the committee provided four specific inclusion criteria:

1. focus on performance that has significant differences in organisational expectations for patient care
2. focus on specific problems or conditions for which there is clear clinical evidence of optimal care (outcome measures)

3. impact as many patients as possible
4. be patient-centered.

This round was inductive, as no predetermined topics were provided to respondents. A response time of approximately 2 weeks was allowed and broadcast reminder prompts were used. The project facilitator performed initial content analysis (20), categorised and organised responses into summary reports in the form of tables. The incidence of each topic's occurrence was used to rank responses. The submissions and summary reports were then reviewed by the committee via teleconferences. These discussions served to validate the categorisations and exclude responses that did not fit the criteria. The top eight items were then selected for the next round.

Round two

The list of eight items was issued (using SurveyMonkey) to all the respondents from round one, together with verbatim descriptions of their clinical outcomes. The list was provided in nominal form and respondents were asked to rank the most important five topics. Importance was defined as having the greatest potential for improving clinical outcomes and experience during the paramedical encounter. Email reminders were issued, and this round took approximately 2 weeks. The resultant rankings were reviewed by the committee via teleconferences and the five highest ranking topics were accepted for the final round.

Round three

Participants were invited to attend a 1-day, face-to-face meeting to obtain a final consensus. The meeting process included presenting each topic, including its outcome measures, to the whole panel (in the form of wall posters) and then having small groups develop lists of advantages and disadvantages for each topic. This was followed by a general group discussion and then members voted. The voting was scheduled so that it took place during breaks from formal discussions. To vote, members placed a paper tag on the poster that they believed was the best fit with the project's aim and the tags were subsequently tallied.

Results

A total of 49, 49 and 38 panel members completed each of the three rounds respectively. This provided participation rates for the second and third rounds of 100% and 78%. Participation by profession is detailed in Table 1.

Table 1. Panel composition and participation rates

Stakeholder profession	Round 1	Round 2	Round 3
Regional base hospital MD	7	7	7
Regional base hospital manager/staff	20	20	20
Paramedic	7	7	5
Ambulance service manager	14	14	5
Regulator	1	1	1
Total	49	49	38
Participation rate	Baseline	100%	78%

Ethics

This study was approved by Sunnybrook Health Sciences Research Ethics Board, ID # 2634.

In round one, the panel suggested 38 different topics (Table 2). In round two the panel received a list of eight topics (Table 3).

Table 2. Round one submissions

Topic	Count (incidence of occurrence)
Patient care guidelines	13
Paramedic competency	11
Pain management	8
Neurology	8
Paramedic education	7
Cardiology	7
Respiratory distress	6
Airway management	5
Cardiac arrest	5
General narrative (cannot be categorised)	5
Infection/sepsis	5
Patient safety/care pathways	5
Patient care standards	5
Behavioral	4
Opioid toxicity	3
Mental health	3
End of life	3
Allergy/anaphylaxis	3
Data management	3
Community paramedicine	2
Documentation	2
Medication administration	2
Patient satisfaction	2
Pediatrics	2
Point of care	2
Trauma	2
Alternative care model	1
IV therapy	1
Nausea/vomiting	1
Paramedic feedback	1
Paramedic professional practice	1
Patient communication	1
Patient experience	1
Provincial standards	1
Trauma/pelvic binders	1
Ventilation management	1

In this second round, the panel ranked the list of eight topics according to their level of importance (Table 4).

Table 3. Round two topics for ranking

Project topic	Description	Outcomes
Airway management	Proposed projects focussed on improving the safety and efficacy of ALS and BLS interventions to open/maintain the airway and assure adequate ventilation	Reduce unnecessary endotracheal intubation and multiple intubation attempts Reduce episodes of hypoxia before, during and following airway interventions Increased utilisation of technology that improves the safety of airway care
Cardiology	Proposed projects focussed on improved screening, assessment and evidence-based interventions for ACS/ STEMI patients	Increased compliance with evidence-based bundled care including ASA administration, 12-lead and system alerts Reduction in STEMI false-positives
Infection/sepsis	Proposed projects focussed on early recognition, aggressive management, appropriate transport and effective handover communications for patients with sepsis	Improved utilisation of sepsis alert protocols Reduction of 'missed' sepsis patients through early recognition and hospital notification Establishment of safe evidence-based protocols for paramedic administration of antibiotics
Mental health/ behavioral	Proposed projects focussed on establishment of improved tools for paramedic recognition and evaluation of patients with behavioral/mental health complaints (chronic and acute), better systems for assuring mental health patients are transported to the most appropriate facility, and reduction in the risk patients and providers experience relate to combative patients and chemical/physical restraint	Improved paramedic ability to differentiate between acute vs. exacerbations of chronic conditions Reduction of patient transports to ED, replacement by treatment and transport to more appropriate facilities Reduction in injuries experienced by combative patients and the paramedics treating them
Neurology	Proposed projects focussed on improvement of assessment and management of seizure and stroke patients, including transport to appropriate speciality facilities	Increase in the proportion of seizure patients who improve during the paramedic encounter through improved use of seizure medications Increased percentage of stroke cases that are recognised early and transported to appropriate specialty centres
Pain management	Proposed projects in this theme focussed on providing pain relief to patients in pain through a combination of improved assessment, non-pharmacologic interventions and appropriate use of analgesics. Focus included review and improvement of pain assessment, available pain therapies and management of patients with chronic pain	Reduction in patient's subjective pain experience during the paramedic encounter Increase in the utilisation of splinting and other non-pharmacologic pain management tools Safe adoption of new analgesics for paramedic use
Patient safety/care pathways	Proposed projects focussed on assuring patients are safely assessed, treated and /or transported to the most appropriate location including treatment onsite without transport. Additional recommendations included recognition of risks to patient safety and creation of a culture of safety that encourages self-reporting of unsafe conditions, adverse events and near misses	Reduced incidence of drug errors Establishment of standardised reporting processes and safe error disclosures Reduction in cancellations, and needless transports to the emergency department
Respiratory distress	Proposed projects in this theme focused on accurate assessment of respiratory distress coupled with improved and effective utilisation of CPAP, ventilators and bronchodilators	Improved selection of appropriate therapy (CPAP vs. bronchodilators) for patients in respiratory distress Improvement in patient's subjective experience of respiratory distress during the paramedic encounter Improvement in patient's objective symptoms of respiratory distress during the paramedic encounter

A weighting system was used to establish a score for each topic as this allowed the submissions to be combined: for each individual ranking of '1' a topic received 5 points, for each ranking of '2' the topic received 4 points, and so on until rankings of '5' were reached. Rankings of 6, 7 and 8 received 0 points. The scoring is outlined in Table 5.

Table 5. Round two scores and ranking

Topic	Score	Rank
Infection/sepsis	114	1
Airway	111	2
Cardiology	107	3
Patient safety/care pathways	102	4
Pain management	85	5
Mental health/behavioural	73	6
Respiratory distress	73	6
Neurology	53	7

In round three, the final ranking consensus was: 1) infection/sepsis (51% of votes) and 2) patient safety/care pathways (49% of votes).

Discussion

An important aspect of Delphi studies is the consistent participation of panel members because without this it would be difficult to claim there had been a progression in the development of a consensus. In this study, the participation rates of 100% between Delphi rounds one and two, and 78% between rounds two and three, demonstrate a high level of sustained participation. In general, Delphi participation rates of 65–70% can be considered high (21,22) and these levels are exceeded by the current study.

Round one

One of the strengths of a Delphi study is that the input from panel members is prepared without undue influence from other panel members (22). This is because members prepare their comments anonymously and independently and are not subject to group dynamics such as personality styles and personal allegiances. They are referencing their own knowledge and experience. This can produce a lengthy list; evident from the responses to round one where the large number of number of topics suggests very little common ground. This is consistent with one of the key functions of the initial round of a Delphi which is to generate ideas (21) and set the study's starting point. Comprising the panel with varied perspectives draws on the different experiences of each member. Since each of these perspectives will have its strengths and weaknesses, combining them provided access to a range of knowledge and opinion.

Round two

For round two, some topics were excluded because the validation process identified them as falling outside the inclusion criteria. Some were not specific enough to pair with precise outcome measures and so, 'patient care guidelines/standards'; 'paramedic competency', 'paramedic education' and 'general narrative' were dropped (19). It is important to note that although these items were out of scope of the current study, they do indicate areas that the respondents believe are deserving of attention. As such they should be considered for further exploration in subsequent inquiries. Two items were combined (mental health and behavioural) as they included very similar conditions and can be considered interchangeable terminology. Any remaining items with a count of five or more were included in the second round. This list included both the topics and patient outcomes, so that the panel could consider the merits of each item and reconcile this information with their own initial views. This step is considered 'closed' because the options for selection

Table 4. Round two responses

Topic	% and raw count ranking as 1	% and raw count ranking as 2	% and raw count ranking as 3	% and raw count ranking as 4	% and raw count ranking as 5	% and raw count ranking as 6	% and raw count ranking as 7	% and raw count ranking as 8
Airway	10.20/5	26.52/13	10.20/5	14.29/7	10.20/5	10.20/5	2.04/1	16.33/8
Cardiology	20.41/10	14.29/7	4.08/2	16.33/8	18.37/9	12.24/6	8.16/4	6.12/3
Infection/ sepsis	20.41/10	18.16/4	26.53/13	12.24/6	2.04/1	8.16/4	18.37/9	4.08/2
Mental health/	10.20/5	18.16/4	14.29/7	10.20/5	12.24/6	12.23/6	12.24/6	20.41/10
Neurology	4.08/2	18.16/4	6.12/3	10.20/5	16.33/8	26.53/13	16.33/8	12.24/6
Pain	6.12/3	16.33/8	16.33/8	6.12/3	18.37/9	8.16/4	16.33/8	12.24/6
Patient safety/care pathways	24.49/12	8.16/4	8.16/4	16.33/8	6.12/3	6.12/3	14.29/7	16.33/8
Respiratory distress	4.08/2	10.20/5	14.29/7	14.29/7	16.33/8	16.33/8	12.24/6	12.24/6

are predetermined. The aim is no longer diverse input, but rather a narrowing of content (21). Round two showed progression towards a ranking consensus, with a high to low range of scores of 114 to 53. This indicated that panel members had given serious consideration to the verbatim outcome descriptions and were proceeding towards a consensus. This is consistent with Agar's (23) observation that for the 'dialogue' process with panel members to be legitimate, the narrative needs to be in the panel's words rather than a narrative that is composed apriori by a researcher. The efficiency provided here by the Delph is also worth noting. It would have been impractical to progress from a list of 38 items to a short list using a face-to-face meeting. Each of the 38 items would have needed to have its merits and drawbacks discussed, likely resulting in prohibitively long discussions.

Round three

Surveys used in traditional Delphi's are sometimes criticised for limiting in-depth exchange of views (18) and so this risk was mitigated by formatting round three as a 1-day face-to-face meeting. To continue the narrowing process and increase reproducibility (24), the top five scoring topics were selected for the meeting. The use of a facilitator helped provide productive discussion during the meeting by encouraging elaboration and in-depth exploration of the merits of each topic. By guiding discussions, the facilitator mitigated group dynamic pitfalls such as the halo-effect (25), or band-wagoning (26). The format of the meeting was designed to encourage input from each member of the panel. Specifically, the use of small group discussions (one group for each topic) provided each member the opportunity to voice their views in a socially safe setting. Each group was tasked with developing a list of advantages and disadvantages for their topic and this procedure served to make the discussions objective. These processes, together with the subsequent presentation of the lists to the entire panel, provided the elaboration that panel members needed to inform their opinions. Inter-personal influences on topic selection were further reduced by timing the actual voting process to take place during breaks when some measure of privacy was available to the panel. The near equal level of votes cast for the two topics 'infection/sepsis' (51%) and 'patient safety/care pathways' (49%) indicated the final ranking consensus (no votes were cast for any other topics). Although this study prioritised topics in our jurisdiction, it is interesting to note that they also appear as research priorities in current paramedical literature. The benefits of early recognition and treatment of pre-hospital sepsis patients appears with some regularity in contemporary research (27-29). Similarly, safely redirecting patients using alternative care pathways, for example those suffering from mental health disorders and/or those needing community support, are active areas of research (30-32). This suggests the possibility of inter-jurisdictional priorities in paramedicine.

While our consensus represents successful initial planning, the topics and measures would need to be validated in our jurisdiction objectively before implementation of improvement initiatives (14). In terms of using a process that produced a strong consensus, our results are consistent with the view that Delphi's with modifications can demonstrate superior results when compared to traditional Delphi studies (33,34).

Limitations

Delphi panels can present some uncertainty in terms of their level of expertise. In our case, we relied on both professional and employment credentials. Loss of panel membership during the study poses a risk of losing expert knowledge (34). This study however had high levels of participation in all three rounds. Also, survey instruments may exclude knowledge if the choices are too limited (35). We mitigated this risk by using an open-ended survey for round one, and open discussions during round three.

Our panel did not include all system stakeholders. Community based services, such as non-emergency response, play an increasing role in modern paramedicine and their input may well have provided different findings. Our recruitment process did not include a diversity strategy, which may also have modified the findings. We specified a patient-centred criterion but did not include direct patient input. Rather, we limited our inquiry to panel members' opinions of what comprised patient-centred topics. It is also important to recognise that broader based consultation would increase the likelihood of success at the implementation stage. Also, we focussed only on clinical topics and this approach therefore excluded important non-clinical aspects of practice. Finally, our findings reflect the opinions of the participants.

Research that includes providers of non-emergency response, diverse participants and direct patient input is warranted. Further, exploring paramedicine's non-clinical aspects would provide more comprehensive information about our systems.

Conclusion

Studies into paramedic systems' inter-agency planning of quality improvement initiatives are uncommon, as are programs based on clinical patient outcomes. This report demonstrates that such studies are feasible and diverse system stakeholders can be highly committed to them. Progressing from 38 to two topics in a short timeframe also demonstrates the efficiency of Delphi processes for planning purposes. Other paramedic organisations may be able to draw on these processes when designing their quality improvement projects.

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Competing interests

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

References

1. Maio R, Bronken T. Quality assurance in emergency medical services systems in Michigan: Report of a survey. QRV Qual Rev Bull 1991;12:392-5.
2. Tello RR, Braude D, Fullerton L, Froman P. Outcome of trauma patients immobilized by emergency department staff, but not by emergency medical services providers: a quality assurance initiative. Prehosp Emerg Care 2014;4:544-9.
3. Sahu N, Matthews P, Groner K, Papas M, Megargel R. Observational study on safety of prehospital BLS CPAP in dyspnea. Prehosp Disaster Med 2017;6:610-4.
4. Mears GD, Pratt D, Glickman SW, et al. The North Carolina EMS data system: a comprehensive integrated emergency medical services quality improvement program. Prehosp Emerg Care 2010;14:85-94.
5. Tsai D, Choi B, Sullivan F, Williams A. Quality improvement in EMS: a unique and challenging necessity. R I Med J 2014;97:17-9.
6. Redlener M, Olivieri P, Loo GT, et al. National assessment of quality programs in emergency medical services. Prehosp Emerg Care 2018;22:3. doi: 10.1080/10903127.2017.1380094
7. Karam M, Brault I, VanDurme T, Jacq J. Comparing interprofessional and interorganisational collaboration in healthcare: a systematic review of the qualitative research. Int J Nurs Stud 2018;79:70-83.
8. Delbridge T, Bailey B, Chew JL, et al. EMS agenda for the future. National Highway Traffic Safety Administration; 1996. Available at: www.nhtsa.gov/people/injury/ems/agenda/
9. American Heart Association. Guidelines update for cardiopulmonary resuscitation and emergency cardiovascular care. Part 4: Systems of care and continuous quality improvement. Circulation 2015;132:S397-413.
10. Daulelin D, Kulick ER, S'Amore K, et al. The Massachusetts Emergency Medical Service Stroke Quality Improvement Collaborative, 2009-12. Prev Chronic Dis 2013;10:130126. doi: http://dx.doi.org/10.5888/pcd10.130126
11. Altman DG, Bland JM. Absence of evidence is not evidence of absence. BMJ Clin Res 1995;311:485. doi: 101136/bmj.3117003.485
12. Matziou V, Vlahioti E, Perdikaris P, et al. Physician and nursing perceptions concerning interprofessional communication and collaboration. J Interprof Care 2014;28:526-33.
13. Katakam L, Suresh K. Identifying a quality improvement project. J Perinatol 2017;37:1161-5.
14. Haugland H, Rehn M, Kelpstad P, Kruger A. EQUIPE collaboration group. Developing quality indicators for physician-staffed emergency medical services: a consensus process. Scand J Trauma 2017;25:14. doi: 10.1186/s13049-017-0362-4
15. Rowe G, Wright G. The Delphi Technique as a forecasting tool: issues and analysis. Int J Forecast 1999;353-75.
16. Weise J, Fisher KR, Trollor J. Utility of a modified online Delphi method to define workforce competencies: lessons from the intellectual disability mental health core competencies project. J Policy Pract Intellect Disabil 2016;1:15-22. doi.org/10.1111/jppi.12142
17. Chan TM, Yarris LM, Humphre-Murto S. Delving into Delphis. Can J Emerg Med 2019;21:167-9.
18. Keeney S, Hasson F, McKenna H. The Delphi technique in nursing and health research. 1st edn. West Sussex: Wiley and Blackwell; 2011.
19. Diamond IR, Grant RC, Feldman BM, et al. Defining consensus: a systematic review recommends methodologic criteria for reporting of Delphi Studies. J Clin Epidemiol 2014;67:401-9. doi: http://dx.di.org/10.1016/j.jclinepi.2013.12.002
20. MacPherson S, Reese C, Wendler C. Methodology update: Delphi studies. Nurs Res 2018;67:404-10. doi: 10.1097NNR.0000000000000297
21. Watson T. Public relations research priorities: a Delphi study. Journal of Communication Management 2008;12:2:104-23.
22. Sumsion T. The Delphi technique: an adaptive research tool. Br J Occup Ther 1998;4:153-6.
23. Agar M. Speaking of ethnography. Newbury Park, CA: Sage, 1986.
24. Shield T, Campbell S, Rogers A, et al. Quality indicators for primary care mental health services. Qual Saf Health Care 2003;12:100-6.
25. Kerr G. Apples, oranges and fruit salad: a Delphi study of the IMC educational mix. Journal of Marketing Communications 2009;15:119-37.
26. Tersine RJ, Riggs WE. The Delphi technique: a long-range planning tool. Business Horizons 1976;2:51-6.
27. Gustafson DH, Shukla RK, Delbecq A, Walster GW. A comparative study of differences in subjective likelihood estimates made by individuals, integrating groups, Delphi groups and nominal groups. Organ Behav Hum Perform 1973;2:280-91. doi: 10.1016/0030-5073(73)90052-4
28. Polito C, Isakov A, Yancey A, et al. Prehospital recognition of severe sepsis: development and validation of a novel EMS screening tool. Am J Emerg Med 2015;33:1119-25.
29. Smyth MA, Brace-McDonnell SJ, Perkins GD. Identification of adults with sepsis in the prehospital environment: a systematic review. BMJ Open 2016:6:e011218.
30. Borrelli G, Kock E, Ethan S, Shannon L, Rech MA. Early recognition of sepsis through emergency medical services pre-hospital screening. Am J Emerg Med 2019;37:1428-32.
31. Tangherlini N, Villar J, Brown J, et al. The HOME team: evaluating the effect of an EMS-based outreach team to decrease the frequency of 911 use among high utilizers of EMS. Prehosp Disaster Med 2016;31:603-7.
32. Bisman V, Prpic J, Michaud S, et al. MP04:rEDirect: safety and compliacne of an emergency department diversion protocol for mental health and addictions patients. Canadian Journal of Emergency Medicine 2019;21(S1):S43-S43.
33. Quatman C, Mondor M, Halweg J, Switzer JA. Ten years of EMS fall calls in a community: an opportunity for injury prevention strategies. Geriatric Orthopaedic Surgery Rehabilitation 2018;41(1):42-48.

34. Graefe A, Armstrong JS. Comparing face-to-face meetings, nominal groups, Delphi and prediction markets on an estimation task. Int J Forcasting 2016;1:183-95. doi:10.1016/j.ijforecast.2010.05.004
35. Watson T. Public relations research priorities: a Delphi study. Journal of Communication Management 2008;2:104-23.
36. Rowe G, Bolger F. Delphi: a re-evaluation of research and theory. Technol Forecast Soc Change 1991;39:235-51.