increased the proportion of ECGs performed within 20 minutes of ED arrival in these patients.
Keywords: chest pain, time-to-electrocardiogram, triage

MP40

What are the factors contributing to medico-legal risk of procedural interventions performed by physicians practicing emergency medicine?

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Introduction: Physicians who practice emergency medicine (EM) often perform procedural interventions, which can occasionally result in unintended patient harm. Our study's objective was to identify and describe the interventions and contributing factors associated with medico-legal (ML) cases involving emergency physicians performing procedural interventions. **Methods:** The Canadian Medical Protective Association (CMPA) is a not-for-profit, ML organization which represented over 99,000 physicians at the time of this study. We extracted five years (2014-2018) of CMPA data describing closed ML cases involving procedural interventions (e.g. suturing, reducing a dislocated joint) and excluding interventions related to pharmacotherapy (e.g. injection of local anesthetic), diagnosis (electrocardiograms) and physical assessments (e.g. ear exams), performed by physicians practicing EM. We then applied an internal contributing factor framework to identify themes. We analysed the data using descriptive statistics. **Results:** We identified 145 cases describing 145 patients who had 205 procedures performed in the course of their EM care. The three most common interventions were orthopedic injury management (47/145, 32.4%), wound management (43/145, 29.7%), and Advanced Cardiac Life Support (24/145, 16.6%). Out of 145 patients, 93.8% (136/145) experienced a patient safety event, and 55.9% (76/136) suffered an avoidable harmful incident. One quarter of patients suffered mild harm (34/76, 25.0%), 18.4% of patients died, 14.5% suffered severe harm, and 13.2% moderate harm. Peer experts were critical of 86/145 cases (59.3%) where the following provider contributing factors were found: a lack of situational awareness (20/68, 29.4%), and deficient physician clinical decision-making (54/68, 79.7%). Clinical decision-making issues included a lack of thoroughness of assessment (33/54, 61.1%), failure to perform tests or interventions (21/54, 38.9%), and a delay or failure to seek help from another physician (17/54, 31.2%). Peer experts were also critical of 48.8% of cases containing team factors (42/86) due to deficient medical record keeping (26/42, 61.9%), and communication breakdown with patients or other team members (25/42, 59.5%). **Conclusion:** Both provider and team factors contributed to ML cases involving EM physicians performing procedural interventions. Addressing these factors may improve patient safety and reduce ML risk for physicians.
Keywords: emergency physicians, medico-legal, procedural interventions

MP41

Crowdsourcing to save lives: A scoping review of bystander alert technologies for out-of-hospital cardiac arrest

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Introduction: Out-of-hospital cardiac arrest (OHCA) constitutes a significant global health burden, with a survival rate of only 10-12%. Early intervention is vital but limited by ambulance response times, low rates of bystander assistance, and access to AEDs. Smartphone technologies have been developed that crowdsource willing volunteers to nearby OHCAs in order to initiate resuscitation prior to ambulance arrival. We performed a scoping review to map the available literature on these crowdsourcing technologies and compared their key operational features. **Methods:** A search strategy was developed for five online databases: Medline, Cochrane, Embase, and Web of Science, as well as Google Scholar. We searched for primary studies and grey literature describing mobile phone technologies that alerted users of nearby cardiac arrests in the community. Two reviewers independently screened all articles and extracted relevant study information. Subsequently, we performed a search of the Google and Apple app stores, a general internet search, and consulted experts to identify all available technologies that might not be described in literature. We contacted developers for information on technology use and specifications to create a detailed features table. **Results:** We included 72 articles examining bystander alerting technologies from 15 countries worldwide, owing to the increasing importance of this topic. We identified 25 unique technologies, of which 18 were described in the included literature. Technologies were either text message-based systems (n = 4) or mobile phone applications (n = 21). Most (23/25) used global positioning systems to direct bystanders to victims and nearby AEDs. Response radii for alerts varied widely from 200m to 10km. Some technologies had advanced features such as video-conferencing with ambulance dispatch and detailed alert settings. Not all systems required volunteers to have first aid training. There were 18 studies examining effects on bystander intervention, all of which showed significant improvements using the technologies. However, only six studies assessed impact on survival outcomes. Key barriers discussed included false positive alerts, legal liability, and potential psychological impact on volunteers. **Conclusion:** Our review provides a comprehensive overview of crowdsourcing technologies for bystander intervention in out-of-hospital cardiac arrest. Future work in this growing field should focus on survival outcomes and methods of addressing barriers to implementation.
Keywords: crowdsourcing, out-of-hospital cardiac arrest, resuscitation

MP42

Evaluating clinical and situational factors related to the likelihood of physician authorization for time-sensitive procedures during mandatory paramedic patches

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Introduction: Delegation of controlled medical acts by physicians to paramedics is an important component of the prehospital care framework. Where directives indicate that physician input is needed before proceeding with certain interventions, online medical control (a "patch") exists to facilitate communication between a paramedic and a Base Hospital Physician (BHP) to request an order to proceed with that intervention. The clinical and logistical setting will contribute to the decision to proceed with or withhold an intervention in the prehospital setting. The aim of this study was to examine the impact of various clinical and situational factors on the likelihood of a patch request being granted. **Methods:** Prehospital paramedic calls that included a mandatory patch point (excluding requests exclusively for

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termination of resuscitation and those records which were unavailable) were identified through review of all patch records from January 1, 2014 to December 31, 2017 for Paramedic Services in our region. Written Ambulance Call Reports (ACRs) and audio recordings of paramedic patches were obtained and reviewed. **Results:** 214 patch records were identified and screened for inclusion. 91 ACRs and audio patch records were included in the analysis. 51 of 91 (56%) patch requests were granted by the BHP. Of the 40 paramedic requests that were not granted, the most commonly cited reason was close proximity to hospital (22/40; 55%) followed by low likelihood of the intervention making a clinical impact in the prehospital setting (11/40; 27.5%). Requests for certain interventions were more likely to be granted than other requests. All requests to perform needle thoracostomy for possible tension pneumothorax, administer atropine for symptomatic bradycardia and treat hemodynamically unstable hyperkalemia were granted (2/2, 3/3 and 7/7, respectively), while requests for synchronized cardioversion (7/19; 37%) and transcutaneous pacing (2/6; 33%) were approved less than half of the time. **Conclusion:** This retrospective review suggests that requests to perform certain critical and potentially time sensitive interventions are more likely to be granted which calls into question the requirement for a mandatory patch point for these procedures. Furthermore, the interplay between proximity to hospital and the decision to proceed with an intervention potentially informs future modifications to directives to facilitate timely, safe and efficient care.

Keywords: mobile communication, online medical control, prehospital

MP43

Evaluating factors related to quality of audio transmission during mandatory paramedic patches and technical barriers to efficient communication in the prehospital setting

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Introduction: Delegation of controlled medical acts by physicians to paramedics is an important component of the prehospital care framework. Where directives indicate that physician input is needed before proceeding with certain interventions, online medical control (a "patch") exists to facilitate communication between a paramedic and a Base Hospital Physician (BHP) to request an order to proceed with that intervention. The quality and clarity of audio transmission is paramount for effective and efficient communication. The aim of this study was to examine the impact of audio transmission quality on the results of paramedic patch calls. **Methods:** Prehospital paramedic calls that included a mandatory patch point (excluding requests exclusively for termination of resuscitation and those records which were unavailable) were identified through review of all patch records from January 1, 2014 to December 31, 2017 for Paramedic Services in our region. Written Ambulance Call Reports (ACRs) and audio recordings of paramedic patches were obtained and reviewed. Prespecified patch audio quality metrics, markers of transmission quality and comprehension as well as the resulting orders from the BHP were extracted. Differences between groups was compared using chi-square analyses. **Results:** 214 records were identified and screened initially. 91 ACRs and audio records were included in the analysis. At least one explicit reference to poor or inadequate call audio quality was made in 55/91 (60.4%) of calls and on average, 1.4 times per call. Of the 91 audited call records, 48 of 91 (52.7%) patches experienced an interruption of the call. Each time a call was interrupted, re-initiation of the call was required, introducing a mean [IQR] delay of 81 [33-68] seconds to re-establish verbal communication. Order requests made by paramedics in calls with no interruptions were approved in 30 of 43 patches (70%) while those requests made in calls with one or more interruptions were approved in only 21 of 48 cases (44%) (Δ26.0%; 95%CI 5.6-43.5%, p = 0.01). **Conclusion:** This retrospective review suggests that audio quality and interruptions of patch calls may impact a physician's ability to approve orders for interventions in the prehospital setting. Focus on infrastructure and technology underlying this important mode of communication may be a fruitful avenue for future improvements in systems where this may be an issue.

Keywords: mobile communication, online medical control, prehospital

MP44

Implementing rural advanced care community paramedics in rural and remote British Columbia: a qualitative research approach

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Introduction: Community paramedicine is well-established with an increasing evidence base to support its role in improving healthcare delivery in Canada and across the world. In British Columbia (BC), the BC Emergency Health Services (BCEHS) community paramedicine program provides an avenue to expand the Advanced Care Paramedic (ACP) role in underserved rural and remote communities across the province. **Methods:** We undertook stakeholder consultations using purposive sampling to better understand the barriers and facilitators impacting the integration of rural advanced care community paramedics (RACCPs) in 6 BC communities and to evaluate stakeholder perspectives of the implementation and impacts of the RACCP. 18 in-depth interviews were completed with a diverse range of stakeholders. The interviews were analyzed using a qualitative descriptive approach and the Theoretical Domains Framework. **Results:** A number of key facilitators and barriers to implementation of the RACCP were identified. Facilitators included the RACCP bridging significant gaps in existing community-based healthcare services including palliative care, harm reduction, and home-based assessment. The RACCP also provides leadership within their communities by actively engaging in the delivery of informal and formal debriefing, mentorship, and education. Identified barriers to RACCP implementation included confusion over the scope of the RACCP role, lack of shared health data, and various regulatory challenges. Several priority areas for ongoing development were also identified including workforce planning, addressing regulatory requirements, developing a strategic and systematic activation and dispatch process, providing continuing mentorship and supports for RACCPs, and the importance for ongoing engagement with end-users to determine the impact of the RACCP role for community health services. **Conclusion:** This research provides a strong foundation for addressing healthcare delivery in rural and remote BC by identifying the unique challenges communities face in healthcare provision and is a leading initiative for the ongoing development of professional paramedic practice across the province.

Keywords: community paramedicine, health service delivery, rural