visits, hospitalization or death. The objective of this study was to perform a systematic review to identify predictors of these adverse outcomes among patients who present to the ED with hyperglycemia. **Methods:** Electronic searches of Medline and EMBASE were conducted for studies published in English between the years 1946 and June 2017. Studies with patients presenting to the ED with hyperglycemia were eligible for inclusion. Both adult and pediatric populations were included, as were diabetic and non-diabetic patients. Two reviewers independently screened all titles and abstracts for relevance to the research question. If consensus could not be reached, full-length manuscripts were reviewed. For any discrepancy, a third reviewer was consulted, and disagreement was resolved through discussion. Study quality was assessed using the Newcastle-Ottawa Quality Assessment Scale. Study- and patient-specific data were then extracted and presented descriptively in the systematic review. **Results:** Thirteen observational studies were included, with a combined total of 664,829 patients. The studies scored between 5 to 8 on the Quality Assessment Scale out of a possible total of 8. Predictors of adverse outcomes included patients in both older and younger (<25) age groups, history of diabetes, multiple comorbidities, patients requiring insulin, sepsis and hyperlactatemia, access to a family physician, a sentinel hyperglycemia visit in the past month, and triage glucose level >20 mmol/L. Protective factors included no admissions in the past year, care from a diabetes team while in hospital, systolic blood pressure between 90-150 mmHg and heart rate >110 bpm. **Conclusion:** This systematic review found eight predictors and four protective factors for adverse outcomes in patients presenting to the ED with hyperglycemia. These factors should be considered for easier identification of higher-risk patients for adverse outcomes in order to guide management and follow-up.

Keywords: hyperglycemia, emergency department, risk factors

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Predictive validity of the Regional Paramedic Program for Eastern Ontario (RPPEO) prehospital sepsis notification tool

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Introduction: Early recognition of sepsis can improve patient outcomes yet recognition by paramedics is poor and research evaluating the use of prehospital screening tools is limited. Our objective was to evaluate the predictive validity of the Regional Paramedic Program for Eastern Ontario (RPPEO) prehospital sepsis notification tool to identify patients with sepsis and to describe and compare the characteristics of patients with an emergency department (ED) diagnosis of sepsis that are transported by paramedics. The RPPEO prehospital sepsis notification tool is comprised of 3 criteria: current infection, fever &/or history of fever and 2 or more signs of hypoperfusion (eg. SBP <90, HR 100, RR24, altered LOA). **Methods:** We performed a review of ambulance call records and in-hospital records over two 5-month periods between November 2014 February 2016. We enrolled a convenience sample of patients, assessed by primary and advanced care paramedics (ACPs), with a documented history of fever &/or documented fever of 38.3°C (101°F) that were transported to hospital. In-hospital management and outcomes were obtained and descriptive, t-tests, and chi-square analyses performed where appropriate. The RPPEO prehospital sepsis notification tool was compared to an ED diagnosis of sepsis. The predictive validity of the RPPEO tool was calculated (sensitivity, specificity, NPV, PPV). **Results:** 236 adult patients met the inclusion criteria with the following characteristics: mean age 65.2 yrs [range 18-101], male 48.7%, history of sepsis 2.1%, on antibiotics 23.3%, lowest mean systolic BP 125.9, treated by ACP 58.9%, prehospital temperature documented 32.6%. 34 (14.4%) had an ED diagnosis of sepsis. Patients with an ED diagnosis of sepsis, compared to those that did not, had a lower prehospital systolic BP (114.9 vs. 127.8, $p = 0.003$) and were more likely to have a prehospital shock index >1 (50.0% vs. 21.4%, $p = 0.001$). 44 (18.6%) patients met the RPPEO sepsis notification tool and of these, 27.3% (12/44) had an ED diagnosis of sepsis. We calculated the following predictive values of the RPPEO tool: sensitivity 35.3%, specificity 84.2%, NPV 88.5%, PPV 27.3%. **Conclusion:** The RPPEO prehospital sepsis notification tool demonstrated modest diagnostic accuracy. Further research is needed to improve accuracy and evaluate the impact on patient outcomes.

Keywords: paramedicine, sepsis notification, prehospital

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Diagnosis of pulmonary embolism in the Canadian context: clinical review findings from a health technology assessment

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Introduction: Pulmonary embolism (PE) is a diagnostic challenge, since it shares symptoms with other conditions. Missed diagnosis puts patients at a risk of a potentially fatal outcome, while false positive results leave them at risk of side effects (bleeding) from unnecessary treatment. Diagnosis involves a multi-step pathway consisting of clinical prediction rules (CPRs), laboratory testing, and diagnostic imaging, but the best strategy in the Canadian context is unclear. **Methods:** We carried out a systematic review of the diagnostic accuracy, clinical utility, and safety of diagnostic pathways, CPRs, and diagnostic imaging for the diagnosis of PE. Clinical prediction rules were studied by an overview of systematic reviews, and pathways and diagnostic imaging by a primary systematic review. Where feasible, a diagnostic test meta-analysis was conducted, with statistical adjustment for the use of variable and imperfect reference standards across studies. **Results:** The Wells CPR rule showed greater specificity than the Geneva, but the relative sensitivities were undetermined. Application of a CPR followed by with D-dimer laboratory testing can safely rule out PE. In diagnostic test accuracy meta-analysis, computed tomography (CT) (sensitivity 0.973, 95% CrI 0.921 to 1.00) and ventilation/perfusion single-photon emission CT (VQ-SPECT) (sensitivity 0.974, 95% CrI 0.898 to 1.00) had the highest sensitivity) and CT the highest specificity (0.987, 95% CrI 0.958 to 1.00). VQ and VQ-SPECT had a higher proportion of indeterminate studies, while VQ and VQ-SPECT involved lower radiation exposure than CT. **Conclusion:** CPR and D-dimer testing can be used to avoid unnecessary imaging. CT is the most accurate single modality, but radiation risk must be assessed. These findings, in conjunction with a recent health technology assessment, may help to inform clinical practice and guidelines.

Keywords: diagnostic imaging, pulmonary embolism, systematic review

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An exploratory study to understand relationship between gameplay experience and observed actions

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Introduction: The GridlockED game is a serious game aimed at teaching junior learners about flow and organization in the emergency

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