comparing the effectiveness and safety of low with standard ketorolac dosing in ED patients with suspected renal colic. The primary objective was to demonstrate the ability to achieve an enrolment target of 2 patients per week. **Methods:** We enrolled a convenience sample of adults presenting to an academic urban ED with unilateral flank pain suspected to be renal colic. We randomized patients to 10 mg (low dose, intervention) or 30 mg (standard dose, control). Participants, treating physicians and nurses, and researchers were blinded to treatment allocation. Our main feasibility outcome was the recruitment rate. Secondary outcomes were changes in pain scores (0-10) at 30 and 120 minutes post-ketorolac administration, vital signs, adverse events and ED length of stay. **Results:** We approached 82 patients, of whom 47 (57.3%) were eligible. Of these, 36 consented to participating and 30 were randomized. The proportion of screened patients who were enrolled was 36.6% (30/82). We completed enrolment over a 21-week period, with an average recruitment rate of 1.5 patients/week (range 0-4). The average baseline pain score for all participants was 6.9 (SD = 2.1). At 30 minutes post-ketorolac administration, the low dose group had a mean pain reduction of 2.0 points compared to a pain reduction of 1.7 in standard dose group (difference = 0.3, 90% CI: -0.7 to 1.4). **Conclusion:** These preliminary results support the possibility that low dose ketorolac may be efficacious in this patient population. We did not meet our target recruitment of 2 patients per week as this was primarily due to restricted recruitment hours. To successfully conduct a larger trial, we would need to expand both recruitment hours and the number of sites.
Keywords: ketorolac, pain control, renal colic

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Utilization and outcomes of children presenting to an emergency department by ambulance

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Introduction: Children account for a low proportion of paramedic transports. Evidence suggests that many pediatric transports are of low acuity, but there are few studies comparing these patients to those that self-present to the ED. Our primary objective was to determine if illness severity was associated with presentation by ambulance among pediatric patients. **Methods:** We undertook a single centre, retrospective cohort study at a tertiary care pediatric centre. All patients presenting to the ED in 2015 by any route other than air ambulance were eligible. Patients were divided into two groups based on the route of presentation – ambulance or self-presentation. The primary outcome was disposition decision; the secondary outcome was CTAS level. To determine whether patient discharge disposition or CTAS was associated with the method of arrival, we conducted generalized estimating equations (GEE) to account for correlation within patients with multiple ED visits. **Results:** Of the 69,092 visits, 69,034 were eligible and analyzed. Of those, 4478 (6.5%) arrived by ambulance, while 64,556 (93.5) self-presented. Those arriving by ambulance had a median age of 10 years [IQR: 2-5 years] vs. 4 years [IQR: 1.75-10 years] in the self-presenting group and were 52.6% male (vs. 52.8%). Two percent of the ambulance cohort were admitted to the ICU (vs. 0.2%), and 16.6% were admitted to the ward (vs. 5%). Patients presenting by ambulance had higher CTAS scores – 5.3% CTAS 1 (vs. 0.3%), 16.4% CTAS 2 (vs. 7.0%), 61.2% CTAS 3 (vs. 45.8%), and 17.1% CTAS 4-5 (vs. 46.9%). The odds of arriving by ambulance were 10.2 x higher for patients admitted to the ICU (OR = 10.2, 95%CI: 7.9 to 13.3) vs.

those discharged home. The odds of arriving by ambulance were 64.2 x (OR = 64.2, 95% CI: 48.6 to 84.7) higher for patients CTAS 1 patients vs. CTAS 5 patients. The top 3 complaints among ambulance patients were neurological (22.5%), respiratory (22.7%), and orthopaedic (11.3%). Among self-presenting patients, the top three were general/minor (20.4%), respiratory (16.4%), and gastrointestinal (14.3%). **Conclusion:** Children presenting to the ED via ambulance are at higher risk for admission to the ward and critical care unit. It is important that paramedics have sufficient training to ensure adequate skills to manage critically ill children. Given the low proportion but higher severity of illness of pediatric transports, further research and consideration must be given to how best to enable paramedics in the management of children.
Keywords: emergency medical services, paediatrics, prehospital

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Emergency physician efficiency benchmarking and diagnostic imaging use

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Introduction: As part of our audit and feedback process, Emergency Physicians (EP) are provided feedback on flow metrics and resource utilization. We analysed the relationship between two specific metrics (adjusted workload measurement (AWM), with the number of patients seen per hour adjusted according to CTAS, and percentage of revisits within 72 hours and diagnostic imaging use. Unfortunately, we are unable to evaluate quality of care, nor appropriateness of DI indication at this stage. **Methods:** We used data from 86 physicians at an academic ED, from June 1, 2015 to May 31, 2017. The Data Envelope Analysis (DEA) model incorporated performance quality measures as outputs and efficiency measures as inputs. DEA is a method widely used in physician performance analysis. The method provides a score (optimal performance efficiency-OPE) for each EP based on maximization of the performance (AWM) in proportion to the combination of efficient use of resources, diagnostic imaging (DI). The score was used to regress against demographic characteristics and training. **Results:** The median AWM was 6.8 (quartiles Q1-Q3 = 6.4-7.4) with the median diagnostic imaging use of percentages of CT (median = 10.1, 8.6-11.9), US (median = 4.7, 3.6-5.6) and x-ray (80, 74-84). The EPs who had highest AWM combined with least use of DI (OPE = 100%), provided median AWM of 9.1 (range 8.9-9.7) with percentage CT, US and x-ray medians at 5.8% (range 5.8-6.2), 2.7% (range 2.4-3.6) and 59% (range 59-72). These provided benchmarks for optimal performance indicators. We found statistically significant differences of OPE scores based on gender (men 4.1 times higher, p < 0.001) and degree (RCPS < CCFPEM, Other < CCFPEM, p < 0.001). Overall AWM diminishes at the rate of 14% (95%CI: 9-20%) for a combination of 100 DI tests ordered. In order to reach the optimal level of performance, to reach an OPE of 100%, the median CT use percentage needs to be reduced by 6% (quartile range 3.9- 7.7%), US by 2.2% (quartile range 1.5-3.4%) and x-rays by 37.2% (quartile range: 26.8-44.3%). Return visit rates were not associated with DI use, possibly due to homogeneity in the percentage of return visits. **Conclusion:** We found significant performance variations in terms of average workload measurement in proportion to the weighted average of diagnostic imaging use, with increased use of DI being associated with decreasing AWM. Percentage of return visits does not appear to be useful as a performance indicator.
Keywords: audit and feedback, diagnostic imaging, efficiency