

injuries make up a significant proportion of total ED visits and approximately half of these patients receive CT imaging in the ED. The CWC campaign did not seem to impact imaging utilization for head injuries in the 14 months following its launch. Further efforts, including local quality improvement initiatives, are likely needed to increase adherence to its recommendation and reduce imaging utilization for head injuries.

**Keywords:** Choosing Wisely, head injury, emergency department

#### LO67

##### **The impact of CPR quality during entire resuscitation episode on survival from cardiac arrest**

I. Drennan, BSc, A.K. Taher, MD, S. Cheskes, MD, C. Zhan, MS, A. Byers, MSc, M. Feldman, MD, PhD, P. Dorian, MD, L.J. Morrison, MD, MSc, S. Lin, MD, CM, MSc, Rescu, St. Michael's Hospital, Toronto, ON

**Introduction:** High-quality cardiopulmonary resuscitation (CPR) is essential for patient survival. Typically, CPR quality is only measured during the first 10 minutes of resuscitation. There is limited research examining the quality of CPR over the entire duration of resuscitation.

**Objective:** To examine the quality of CPR over the entire duration of resuscitation and correlate the quality of CPR to patient survival.

**Methods:** This was a retrospective observational study using data from the Toronto RescuNET Epistry-Cardiac Arrest database. We included consecutive, adult (>18) OHCA treated by EMS between January 1, 2014 and September 30, 2015. High-quality CPR was defined, in accordance with 2015 AHA Guidelines, as a chest compression rate of 100-120/min, depth of 5.0-6.0 cm and chest compression fraction (ccf) of >0.80. We further categorized high-quality resuscitation as meeting benchmarks >80% of the time, moderate-quality between 50-80% and low-quality meeting benchmarks <50% of the resuscitation. We used multivariable logistic regression to determine association between variables of interest, including CPR quality metrics, and survival to hospital discharge. **Results:** A total of 5,208 OHCA met our inclusion criteria with a survival rate of 8%. The median (IQR) duration of resuscitation was 23.0 min (15.0,32.7). Overall CPR quality was considered high-quality for ccf in 81% of resuscitation episodes, 41% for rate, and 7% for depth. The percentage of resuscitations meeting the quality benchmarks differed between survivors and non-survivors for both depth (15% vs 6%) and ccf (61% vs 83%) (P value <0.001). After controlling for Utstein variables maintaining a chest compression depth within recommendations for >80% showed a trend towards improved survival (OR 1.68, 95% CI 0.96, 2.92). Other variables associated with survival were public location, initial CPR by EMS providers or bystanders, witnessed cardiac arrest (EMS or bystander), and initial shockable rhythm. Increasing age and longer duration of resuscitation were associated with decreased survival. **Conclusion:** Overall, EMS providers were not able to maintain rate or depth within guideline recommendations for the majority of the duration of resuscitation. Maintaining chest compression depth for greater than 80% of the resuscitation showed a trend towards increased survival from OHCA.

**Keywords:** cardiac arrest, cardiopulmonary resuscitation, emergency medical services

#### LO68

##### **Extracorporeal membrane oxygenation in the emergency department for resuscitation of out-of-hospital cardiac arrest patients: a systematic review**

M.M. Beyea, MD, PhD, B.W. Tillmann, MD, BSc, A.E. Lansavichene, MLIS, V. Randhawa, MD, PhD, K. Van Aarsen, MSc, A. Nagpal, MD, MSc, Western University, London, ON

**Introduction:** With one person in Canada suffering an out-of-hospital cardiac arrest (OHCA) every 12 minutes and an estimated survival to hospital discharge with good neurologic function ranging from 3 to 16%, OHCA represents a major source of morbidity and mortality. An evolving adjunct for resuscitation of OHCA patients is the use of extracorporeal membrane oxygenation-assisted CPR (ECPR). The purpose of this systematic review is to investigate the survival to hospital discharge with good neurologic recovery in patients suffering from OHCA treated with ECPR compared to those who received standard advanced cardiac life support with conventional CPR (CCPR) alone.

**Methods:** A systematic database search of both MEDLINE & EMBASE was performed up until September 2016 to identify studies with  $\geq 5$  patients reporting ECPR use in adults (age  $\geq 16$  years) with OHCA. Only studies reporting survival to hospital discharge were included. All identified studies were assessed independently using pre-determined inclusion criteria by two reviewers. Study quality and risk of bias were evaluated using the Newcastle Ottawa regulations assessment scale. **Results:** Of the 1065 records identified, 54 studies met all inclusion criteria. Inter-rater reliability was high with a kappa statistic of 0.85. The majority of studies were comprised of case series (n = 45) of ECPR with 5 to 83 patients/study. Out of the 45 case series, 37 presented neurologic data at hospital discharge and demonstrated a broad range of patients surviving with good neurologic outcome (0 to 71.4%). Only 9 cohort studies with relevant control group (CCPR) were identified (38 to 21750 patients/study). Preliminary analysis demonstrated that 6 cohort studies were sufficient quality to compare ECPR to CCPR. All 6 studies showed significantly increased survival to hospital discharge with good neurologic recovery (ECPR 10.6 to 41.6% vs CCPR 1.5 to 7.7%, respectively). **Conclusion:** Given the paucity of studies using appropriate comparators to evaluate the impact of ECMO, our confidence in a clinically relevant difference in outcomes compared to current standards of care for OHCA remains weak. Interestingly, a limited number of studies with suitable controls demonstrated a potential benefit associated with ECPR in the management of OHCA in selected patients. In this state of equipoise, high quality RCT data is urgently needed.

**Keywords:** cardiac arrest, extracorporeal cardiopulmonary resuscitation, survival with good neurologic outcome

#### LO69

##### **Evaluating the impact of night shifts on emergency medicine resident competence in simulated resuscitations**

S. Edgerley, BSc, C. McKaigney, MD, D. Boyne, MSc, D. Dagnone, MD, MMed, A.K. Hall, MD, MMed, Queen's University, Kingston, ON

**Introduction:** Sleep deprivation negatively affects cognitive and behavioural performance. Emergency Medicine (EM) residents commonly work night shifts and are then expected to perform with competence. This study examines the impact of night shifts on EM resident performance in simulated resuscitation scenarios. **Methods:** A retrospective cohort study was completed at a single Canadian academic centre where residents participate in twice-annual simulation-based resuscitation objective structured clinical examinations (OSCEs). OSCE scores for all EM residents between 2010-2016 were collected, as well as post-graduate year (PGY1-5), gender, and shift schedules. OSCEs were scored using the Queen's Simulation Assessment Tool (QSAT) evaluating four domains: primary assessment, diagnostic actions, therapeutic actions and communication, and an overall global assessment score (GAS). A night shift was defined as a late evening (beyond 23:00) or overnight shift within the three days before an OSCE. A mixed effects linear regression model was used to model the