



Abstract 292 Figure 3

associated with a high rate of adverse events. Several initiatives to improve safety (such as video laryngoscopy, checklists, simulation training etc.) have been studied in isolation.

It remains unclear as to whether these interventions have been embedded in the Emergency Department (ED) and whether they offer cumulative marginal gains in safety.

**Methods/Design** A prospective 3-year service evaluation delivered at a major trauma and neurosciences centre between 2016 and 2019. We designed a rolling quality improvement program to mitigate procedural airway risk through collaborative multidisciplinary team (MDT) working, education and transparent metrics.

PDSA cycles included documentary guidance (including flowcharts and checklists), high fidelity simulation training, equipment redesign, prefilled medications and mandatory reporting items (figure 1).

**Results/Conclusions** We analysed prospectively collected data on 1181 intubation episodes outside a theatre environment over a 39 month period, of which 575 (48.7%) were performed out of hours and 635 (53.8%) were performed in the ED.

Bedside consultant presence and periprocedural checklist use both showed a sustained increase during the study period. Use of ketamine and thiopentone as primary induction agents increased and decreased, respectively (figure 2). Cricoid pressure and video laryngoscopy (VL) utilisation rates remained relatively static throughout, as did a first pass success (FPS) rate of between 83.0 to 93.5%.

Composite major complications (including sustained hypotension and/or critical hypoxia) were significantly reduced during the study period, as demonstrated via statistical process chart (SPC) mapping (figure 3).

In conclusion, we found a quality improvement program to be associated with a sustained reduction in the risk of major complications following emergency airway management. This improvement was not explained by simple direct changes in procedural care, such as the use of VL or technique changes resulting in improved FPS, but may have been influenced by unknown confounding variables.

## 192 PRIMARY CARE STREAMING IN EMERGENCY DEPARTMENTS- CONTEXTS AND MECHANISMS ASSOCIATED WITH PERCEIVED EFFECTIVENESS OUTCOMES: A REALIST EVALUATION

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**Aims/Objectives/Background** Recent policy has encouraged emergency departments (EDs) to deploy nurses to stream patients from the ED front door to GPs working in a separate GP service operating within or alongside an ED. We aim to describe mechanisms relating to effectiveness of streaming in different primary care service models identified in emergency departments. We explored whether patients were appropriately streamed to emergency care, primary care, other hospital services or community primary care services; *patient flow* (including effects on waiting times and length of stay in the emergency department); and *safe streaming outcomes*. We sought suggestions for quality improvements relating to streaming.

**Methods/Design** A realist evaluation methodology was used to explore perceived streaming effectiveness. We visited 13 emergency departments (purposively selected across England & Wales; 8 streamed primary care patients to a primary care clinician) and carried out observations of triage/streaming and patient flow and interviews with key members of staff (consultants, GPs, nurses). Field notes from observations and audio-recorded interviews were transcribed verbatim and were analysed by creating context, mechanism and outcome configurations to refine and develop theories relating to streaming effectiveness.

**Results/Conclusions** We identified five contexts (nurses' knowledge and experience, streaming guidance, teamwork and communication, operational management and strategic management) that facilitated mechanisms that influenced the effectiveness of streaming (streaming to an appropriate service, patient flow,

## Abstracts

delivering safe care). We integrated a middle range psychological theory with our findings to recommend a focus for training nurses in streaming and service improvements. We recommend a collaborative approach to service development, guidance and training (including input from emergency department clinicians, primary care clinicians) and a range of training strategies that are suitable for less experienced junior nurses and more experienced senior nurses and nurse practitioners.

11

### EXTERNAL VALIDATION OF THE DUTCH PREDICTION MODEL FOR PREHOSPITAL TRIAGE OF TRAUMA PATIENTS IN SOUTH WEST REGION OF ENGLAND, UNITED KINGDOM

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**Aims/Objectives/Background** This is the first external validation of a European empirically derived prediction model for identifying major trauma in an unselected group of injured patients transported by ambulance in the United Kingdom.

**Methods/Design** This study was an external validation of a Dutch prediction model for identifying major trauma using a retrospective cohort of injured patients who ambulance crews transported to hospitals in the South West region of England. Major trauma was defined as Injury Severity Score (ISS)>15.

Participants were patients  $\geq$ 16 years with a suspected injury and transported by ambulance from February 1, 2017 to February 1, 2018. This study had a census sample of cases available to us over a one year period.

We tested the accuracy of the prediction model in terms of discrimination, calibration, clinical usefulness, sensitivity and specificity and under- and over triage rates compared to existing trauma triage practices in the South West region.

**Results/Conclusions** A total of 68 698 adult patients were included in the final external validation cohort. The median age of patients was 72 (i.q.r. 46–84); 55.5% were female; and 524 (0.8%) had an ISS>15. In comparison the Dutch cohort was younger (45 years), more were male (58.3%) and more patients had an ISS>15. (8.8%) The model achieved good discrimination with a C-Statistic 0.75 (95% CI, 0.73 – 0.78). At a maximal specificity of 50% the model resulted in a sensitivity of 86%. The model improved undertriage rates at the expense of increased overtriage rates compared with routine trauma triage methods in the South West of England.

The Dutch prediction model for identifying major trauma can lower the undertriage rate to 17%, however it would increase the overtriage rate to 50% in this UK cohort. Further research is needed to determine whether the model can be practically implemented by paramedics and is cost-effective.

140

### KILLED IN ACTION (KIA): AN ANALYSIS OF MILITARY PERSONNEL WHO DIED OF THEIR INJURIES BEFORE REACHING A DEFINITIVE MEDICAL TREATMENT FACILITY IN AFGHANISTAN (2004–2014)

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**Aims/Objectives/Background** Most fatalities from trauma, in civilian and military settings, die before reaching a hospital. However, no previous studies have comprehensively examined this phase of care. The aim of this study was to define the time interval between injury and death in UK military personnel who died pre-hospital from enemy action (Killed in Action, KIA).

**Methods/Design** The UK Joint Trauma Theatre Registry (JTTR) was used to identify all UK military personnel who died in Afghanistan (2004–2014). Through novel linkage of medical and tactical databases, an accurate timeline of events was obtained. Cause of death was determined from post mortem review. The primary objective was to report time between injury and death. Secondary objectives: mortality at key time-points, the temporal lethality of different anatomical injuries, and trends in the case fatality rate (CFR, defined as deaths/injuries  $\times 100$ ). Data are reported as n(%), and median [interquartile range]. Proportions compared with a Fisher's exact test, and survival was with a Gehan-Breslow-Wilcoxon test; level of significance was corrected by Bonferroni.

**Results/Conclusions** 2413 UK personnel were injured in Afghanistan from 2004–2014; 448 died, a CFR of 18.6%. 390 (87.1%) of total deaths (KIA + Killed Non-Enemy Action) were prehospital. Complete timeline data were available for n=303 (87.1%) KIA – this cohort had a median injury severity score of 75.0 [55.5–75.0]. The median time between injury and death in KIA was 0.0 [0.0–21.8] minutes; 173 (57.1%) died immediately, and by 10 min more than two-thirds had died. Primary injury to the head had a significantly shorter time to death compared to the abdomen and lower extremity (both  $p<0.01$ ). Significant improvement in survival over the decade was due to a reduction in pre-hospital CFR without an increase in in-hospital CFR.

Over two-thirds of KIA deaths occurred within 10 min of injury. Improvement in the CFR in Afghanistan was predominantly in the prehospital phase.

160

### STUDY OF SHORTNESS OF BREATH (SOB) POINT-OF-CARE BIOMARKER PANEL IN PATIENTS PRESENTING WITH SHORTNESS OF BREATH IN EMERGENCY DEPARTMENT

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**Aim** Study of shortness of breath (SOB) point-of-care biomarker panel in patients presenting with shortness of breath in Emergency Department.

**Objective** To study the sensitivity and specificity of SOB point-of-care biomarker panel in diagnosing Acute Coronary Syndrome (ACS), Heart Failure (HF) and Pulmonary Embolism (PE).

**Background** Shortness of breath (SOB) is one of the commonest symptoms of patients presenting to the emergency department (ED).

The differential diagnosis of SOB is very vast, knowing the frequency and severity potential of ACS, HF and PE should be considered.

**Methods/Design** 165 consecutive subjects 18 or more years old, presenting to the ED due to a primary complaint of SOB were included in this prospective study.

After detailed history and thorough physical examination, the blood samples of patients included in the study were