

## 19 PRE-HOSPITAL OXYGEN THERAPY AND CO<sub>2</sub> RETENTION IN PATIENTS ADMITTED THROUGH THE EMERGENCY DEPARTMENT

M Lumholdt\*, E Cresciolo, A Monti, LR Sørensen, KA Damgaard. *Vendsyssel Hospital, Denmark*

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**Aim** Patients with severe COPD are at risk of CO<sub>2</sub> retention, due to uncontrolled oxygen administration. In Denmark, emergency medical service (EMS) care only offers respiratory support with 100% oxygen and treatment with fractionated oxygen is limited. In this retrospective study we sought to clarify the extend at which patients with hypercapnic acidosis, due to excessive pre-hospital oxygen therapy, were admitted through the emergency department (ED).

**Methods** Patients admitted through the ED were divided according to triage score. Venous blood samples were collected from all patients and arterialised using the venous to arterial conversion (v-TAC) software. All admissions of patients with CO<sub>2</sub> retention (pCO<sub>2</sub>>6.0 kPa) and acidosis (pH<7.35) were identified. Patient records and EMS journals were reviewed to determine out-of-hospital saturation and vital signs.

**Results** 125 admissions were registered concerning respiratory issues. 11 patients had CO<sub>2</sub> retention and acidosis. Mean pre-hospital saturation was 83.6% at first patient contact. Saturation increased to 95.0% upon arrival at the ED, and when triage took place in-hospital, saturation decreased to 91.1%. Blood gas revealed mean pH 7.29, pCO<sub>2</sub> 8.72 kPa, and pO<sub>2</sub> 10.2 kPa. But pCO<sub>2</sub> values as high as 11 kPa were registered. All blood samples were drawn as part of the triage.

**Conclusion** Although few patients were identified with CO<sub>2</sub> retention, results indicated that the cause most likely was high oxygenation pre-hospital. Studies exploring optimised pre-hospital oxygen therapy for patients with CO<sub>2</sub> retention tendencies are required.

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## 20 HYGIENE IN THE EMERGENCY MEDICAL SERVICES (EMS) CALLS FOR ATTENTION

<sup>1,2</sup>HS Vikke\*, <sup>2</sup>M Giebner, <sup>1,3</sup>HJ Kolmos. <sup>1</sup>Department of Clinical Research, University of Southern, Odense University Hospital, Denmark; <sup>2</sup>Falck Denmark A/S; <sup>3</sup>Department of Clinical Microbiology, University of Southern Denmark, Odense University Hospital, Denmark

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**Aim** Contaminated environmental surfaces are known to provide an important potential source for transmission of healthcare associated pathogens<sup>1</sup> and prehospital treatment appears related to increased risk of infection.<sup>2</sup> Nevertheless, few studies present and discuss prehospital hygiene, resulting in limited knowledge and understanding of related challenges. Our aim was to assess microbial contamination and influencing factors.

**Methods** A nationwide, semi-blinded, cross-sectional study conducted in Denmark from August to November 2016. Using a combined swab/agar method, samples from environment, equipment and personnel were randomly collected from 80 ambulances and crew, in-between patient courses, after cleaning. Focus was colony forming units (cfu) and healthcare associated pathogens. In addition, explanatory variables e.g. hours from last thorough cleaning, area of service (rural/city) and

number of patient courses within the shift, were collected and used in bivariate analyses.

**Results** 800 sites, showed an average of 11.3 cfu/cm<sup>2</sup> (environmental sites 5.01 cfu/cm<sup>2</sup>, hands 11.1 cfu/cm<sup>2</sup> and uniforms 30.6 cfu/cm<sup>2</sup>). *Staphylococcus aureus*, *Enterococcus* and *Enterobacteriaceae* were found on 10, 3.4 and 0.5% of the imprints, respectively. One imprint was MRSA, two were VRE but none was ESBL, and we found no correlation between the explanatory variables and the degree of microbial burden.

**Conclusion** Microbial contamination and related challenges in the EMS calls for further attention. Several sites were contaminated with healthcare associated pathogens, but neither time from cleaning, number of patients nor area of service were of influence on the degree of contamination. Future research on hygienic challenges and routes of transmission is recommended.

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## 21 PREHOSPITAL NATIONAL EARLY WARNING SCORE (NEWS) DOES NOT PREDICT ONE DAY MORTALITY

J Pirneskoski\*, J Nurmi, K Olkkola, M Kuisma. *Helsinki University Hospital, Helsinki, Finland*

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**Aim** National Early Warning Score (NEWS)<sup>1</sup> has been shown to be the best early warning score to predict in-hospital mortality.<sup>2</sup> A single study also supports it's use in a prehospital setting.<sup>3</sup> The aim of the current retrospective cohort study was to investigate the association of prehospital NEWS and mortality using large population based databases.

**Methods** We analysed prehospital electronic patient record data to calculate NEWS values and compared these to national mortality data. We included all patient records for patients 18 years or older with sufficient prehospital data to calculate NEWS from 17 August 2008 to 18 December 2015 encountered by the emergency medical services (EMS) in the Hospital District of Helsinki and Uusimaa, Finland. The primary outcome measure was death within one day of EMS dispatch.

**Results** 35 845 cases were included. Mean age of patients was 65.8 years (SD 19.9 years). 47.5% of patients were male. Median NEWS was 3 (IQR 1–5). The primary outcome of death within one day of EMS dispatch occurred in 441 (1.2%) cases. The AUROC for primary outcome of death within one day was 0.502.

**Conclusion** In our retrospective cohort study, prehospital NEWS did not predict mortality within one day of EMS dispatch.

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## OUT-OF-HOSPITAL CARDIAC ARREST AS A MANDATORY REPORTABLE DISEASE – FIRST EXPERIENCES FROM NORWAY

<sup>1,2</sup>J Kramer-Johansen\*, <sup>2</sup>I Tjelmeland, <sup>3</sup>J Langørgen, <sup>4</sup>E Søreide. <sup>1</sup>Oslo University Hospital, Oslo, Norway; <sup>2</sup>University of Oslo, Oslo, Norway; <sup>3</sup>Haukeland University Hospital, Bergen, Norway; <sup>4</sup>Stavanger University Hospital, Stavanger, Norway

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**Aim** Survival after cardiac arrest (CA) depends on the time-critical interventions summarised in the chain of survival – identification and alarming, cardiopulmonary resuscitation (CPR), defibrillation (if appropriate), and standardised post-arrest care. Voluntary, population based CA-registries have indicated significant improvements in survival associated with improved performance. Systematic improvement is based on repeated cycles of; measure to identify weakness, interventions to improve, and measure again to verify changes and effects. Strengthening CA-registries by making CA a mandatory reportable disease enables implementation.

**Methods** Norway has a population of ~5.2 million. The Norwegian Cardiac Arrest Registry (NorCAR) restarted in 2013 with mandatory reporting in collaboration with Norwegian Cardiovascular Disease Registry. We measured “coverage” as the percentage of the Norwegian population served by the reporting EMS, and report incidence and survival rates per 100 000 person-years.

**Results** Out of the 19 EMS health trusts in Norway, the number reporting to NorCAR (coverage) increased from 8 (47%) in 2013, to 17 (92%) in 2015, and by 2017 all EMS health trust are reporting. Incidence rates of ambulance-treated CA have increased: 41, 44, 48, and 51. Thirty-day survival rates from all-cause out-of-hospital CA in 2013, 2014, and 2015 were: 7.7 (19%), 5.9 (14%), 7.3 (15%), respectively. For first 2/3 of 2016 numbers are 6.8 (13%).

**Conclusion** Establishing mandatory reporting is valuable when creating a population based registry. Regional variations inspire further work to improve reporting and quality. Close involvement of the local registrars and feeding back the results to local EMS are our main strategies.

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## HELICOPTER EMERGENCY MEDICAL SERVICES IN MAJOR INCIDENT MANAGEMENT: NATIONAL NORWEGIAN CROSS-SECTIONAL SURVEY

<sup>1,2,3</sup>AS Johnsen\*, <sup>1,2,4</sup>SJM Sollid, <sup>1,5</sup>T Vigerust, <sup>1,5</sup>M Jystad, <sup>1,2,3</sup>M Rehn. <sup>1</sup>Department of Research and Development, Norwegian Air Ambulance Foundation, Drøbak, Norway; <sup>2</sup>Department of Health Studies, University of Stavanger, Stavanger, Norway; <sup>3</sup>Department of Anaesthesiology, Oslo University Hospital, Oslo, Norway; <sup>4</sup>Norway Air Ambulance Department, Oslo University Hospital, Oslo, Norway; <sup>5</sup>Norwegian Air Ambulance Ltd, Lørenskog/Dombås Base, Lørenskog/Dombås, Norway

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**Aim** Helicopter Emergency Medical Services (HEMS) and Search and Rescue (SAR) helicopters are highly specialised, sparse resources that are used in major incidents (MI) to transport medical personnel to the scene for triage, treatment and transport.<sup>1</sup> We aimed to collect data on experiences from Norwegian HEMS/SAR from the last five years to identify potential areas of improvement in preparedness for and management of MI.

**Methods** All Norwegian HEMS/SAR personnel were invited to participate in a cross-sectional survey. They were presented with questions regarding basic demographic data, experience from real incidents and training and equipment.

**Results** Of 329 invited, 229 (70%) responded. Rescue paramedics and pilots had experience from a median of three MI, doctors had experience from a median of one. Road traffic incidents were most common (n=61, 48%), blunt trauma the dominating injury (n=51, 59%). HEMS/SAR crewmembers mainly contributed with triage, treatment and transport. Multiple helicopters attended 83% of the incidents. Own or other HEMS/SAR unit coordinated on-scene helicopters in 71% of MI, only 41% of the pilots had guidelines for coordination. Communication with participating agencies was described as bad prior to arrival, but good to excellent on-scene. Among SAR pilots, 80% (n=20) reported lack of equipment for situational awareness, but only 9% (n=3) among the HEMS pilots. More interdisciplinary exercises were desirable.

**Conclusion** HEMS/SAR crewmembers have infrequent exposure to MI management. Communication remains a challenge. Training on frequent scenarios with other agencies is called for.

## REFERENCE

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## CITIZENS' UTILISATION AND SATISFACTION WITH A NOVEL ORGANISATIONAL STRUCTURE OF PREHOSPITAL ACCESS TO HOSPITAL CARE

<sup>1,2</sup>H Gamst-Jensen\*, <sup>1</sup>N Blomberg, <sup>1</sup>F Folke, <sup>1</sup>F Lippert. <sup>1</sup>Emergency Medical Services Copenhagen, Ballerup, Denmark; <sup>2</sup>The National Institute for Public Health, University of Southern Denmark, Copenhagen, Denmark

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