

variance and incidence rates can aid campaigns to improve survival. Data extraction and analysis on treatment prior to arrest and clearing of confounding factors might lead to more effective campaigns to improve survival.

REFERENCE

- Moeller, S.G. *et al*, Temporal trends in survival after out-of-hospital cardiac arrest in patients with and without underlying chronic obstructive pulmonary disease. *Resuscitation* **104** (2016) 76–82.
- Karlsson, L.I.M. *et al*, Diurnal variations in incidence and outcome of out-of-hospital cardiac arrest including prior comorbidity and pharmacotherapy: A nationwide study in Denmark. *Resuscitation* **85** (2014) 1161–1168.

Conflict of interest None.

Funding None.

34 EVALUATION OF DISPATCH OUTCOMES AND STAFFING OF THE COPENHAGEN MOBILE HEALTH AND SOCIAL CARE UNIT

¹SL Østergaard*, ^{1,2}RM Lyngby. ¹Copenhagen Emergency Medical Services, Denmark; ²Kingston University and St George's, University of London, UK

10.1136/bmjopen-2019-EMS.34

Background The mobile health-/social care unit (MHSCU) is a specialized unit within the Emergency Medical Services (EMS) in the Capital Region of Denmark. It provides acute social care for social deprived citizens and is staffed with a social worker and a paramedic. This study was to evaluate the MHSCU-dispatch outcomes and the combination of paramedical and social effort.

Method Data on the total number of MHSCU dispatches and outcomes in 2016 and 2017 was retrieved from the dispatch system operated by EMS Copenhagen and descriptively analyzed. **Results** MHSCU was dispatched 2976 times. Of these 384 patients (12.9%) were brought to a somatic emergency department (ED) and 255 (8.6%) to a psychiatric ED. A total of 355 patients (11.9%) were left to selfcare while 196 (6.6%) were brought to a shelter. Referred from EMS was 41 (1.4%) and referred to EMS was 4 (0.1%). referred to police was 13 (0.4%). In 1386 (46.6%) cases MHSCU were doing proactive work, citizen had left scene or MHSCU was cancelled. The remaining 342 (11.5%) were 'unknown'.

Conclusion Based on the low referral to emergency ambulances and police, the dispatch of MHSCU seems well-prioritized. Dispatches-outcome also indicate the need for both paramedical and social staffing as there is an approximately even distribution between health related and social related referral. This study concludes that a MHSCU can serve as a valuable resource in EMS systems.

Conflict of interest None.

Funding None.

35 USE OF MASS TRANSFUSION SCALES IN PREHOSPITAL SETTING

¹D Bélanger-Quintana*, ¹J de la Cuerda del Olmo, ¹E Sanz de Miguel, ¹E Corral Torres, ¹S Apilluelo Gutierrez, ¹M Castellanos Muñoz, ¹L Ramirez Freire, ¹LL Zubillaga Carmona, ²B Bernardino Cuesta. ¹SAMUR – Civil Protection, Madrid, SPAIN; ²Hospital Universitario Infantil Niño Jesus, Madrid, SPAIN

10.1136/bmjopen-2019-EMS.35

Background Hemorrhagic shock is one of the leading causes of death in trauma. Prompt implementation of transfusion with blood related products and surgery mitigate the effects of bleeding and shock. Early warning of mass transfusion needs by prehospital units could shorten the time of initiation of hospital protocols.

Objective To evaluate the adequacy of mass transfusion scales TASH and ABC in the prehospital setting.

Method Case control study of patients that were transfused in hospital and were treated and transported by SAMUR - Civil Protection. Both TASH and ABC scales were calculated and related with who received transfusion. Statistical analysis was used to describe the relation.

Results A total of 66 patients received transfusion. Median age of 41.5 years. 74.2% were male. A cut-off point of 16 or more was used as positive for transfusion need in the TASH scale and of 2 or more for the ABC scale. TASH showed a 100% sensitivity for transfusion need and ABC showed a 67%. **Conclusion** Using predictive scales in the prehospital setting could give hospitals more time to activate their mass transfusion protocols. Scales should be easy to use and calculate. TASH has shown to be a good scale but is harder to calculate than ABC. Further testing of other scales could prove helpful to better the warning system between hospital and prehospital units.

REFERENCES

- Massive transfusion predictive scores in trauma. Experience of a transfusion registry M. Chico-Fernández, C. García-Fuentes, M.A. Alonso-Fernández, D. Toral-Vázquez, S. Bermejo-Aznarez, E. Alted-López.
- Trauma Associated Severe Hemorrhage (TASH)-Score: Probability of Mass Transfusion as Surrogate for Life Threatening Hemorrhage after Multiple Trauma Yücel, Nedim MD; Lefering, Rolf PhD; Maegele, Marc MD; Vorweg, Matthias MD; Tjardes, Thorsten MD; Ruchholtz, Steffen MD; Neugebauer, Edmund A. M. PhD; Wappler, Frank MD; Bouillon, Bertil MD; Rixen, Dieter MD; the 'Polytrauma Study Group of the German Trauma Society'.
- Early prediction of massive transfusion in trauma: simple as ABC (assessment of blood consumption)? Nunez TC1, Voskresensky IV, Dossett LA, Shinall R, Dutton WD, Cotton BA.

Conflict of interest None.

Funding None.

36 DOES UNGUIDED CARDIO-PULMONARY-RESUSCITATION IN COPENHAGEN ACHIEVE HIGH QUALITY RECOMMENDATIONS?

^{1,2}RM Lyngby*, ²T Quinn, ²D Nikolettou, ¹F Folke. ¹Copenhagen Emergency Medical Services, Denmark; ²Kingston University and St George's, University of London, UK

10.1136/bmjopen-2019-EMS.36

Background Survival from out-of-hospital cardiac arrest (OHCA) is associated with the quality of cardio-pulmonary-resuscitation (CPR). The European Resuscitation Council (ERC) and American Heart Association (AHA) define high quality CPR as compression depth of 5–6 centimeters, compression rate of 100–120 compressions/minute, full recoil (>400 milliseconds) after each compression and a hands-on time (compression fraction) of at least 60% (ERC) or 80% (AHA). The aim of this study was to investigate if unguided CPR performed by Copenhagen Emergency Medical Services (EMS) met these recommendations.

Method From October throughout December 2018, OHCA data were collected from ambulances within the Capital Region of Denmark using Zoll X-series defibrillator (without

CPR feedback dashboard or metronome). Only cases where EMS performed CPR were included. Data was uploaded to a central database and extracted to EXCEL for descriptive statistics and preliminary results.

Results EMS CPR was performed in 330 cases of which 252 were available for analysis. Mean (SD) compression depth was 5.6 ± 1.7 centimeters, compression rate was 110 ± 9.8 compressions/minute, release velocity was 410 ± 125.1 milliseconds, compression quality (correct compression depth + correct compression rate) was $13.8\% \pm 15.6$ and compression fraction was $69.7\% \pm 22.2$.

Conclusion The quality of EMS-delivered CPR, unguided by feedback or metronome, was within recommendations for compression depth, compression rate and release velocity. CPR fraction was between ERC and AHA guidelines. Compression quality, which is not included in ERC/AHA recommendations, did not reach the manufactures recommended $>60\%$. Further work is ongoing to evaluate the effect of adding real-time feedback to guide EMS CPR.

Conflict of interest None.

Funding Trygfonden.

37 CLINICAL AND ENVIRONMENTAL FACTORS ARE NOT ASSOCIATED WITH FAILED PRE-HOSPITAL INTRAVENOUS ACCESS

^{1,2}RM Lyngby*. ¹Copenhagen Emergency Medical Services, Denmark; ²Kingston University and St George's, University of London, UK

10.1136/bmjopen-2019-EMS.37

Background Establishing intravenous (IV) access is a vital part of the paramedic scope of practice and in critically ill patients IV access is essential to administer fluids and/or drugs. However, in the unique pre-hospital environment several factors challenge the procedure. The aim of this study was to investigate clinical and environmental factors associated with failed IV access.

Method During a two-month period in 2018 data containing information on IV procedure characteristics, patient condition and environmental factors were obtained by paramedics operating in the Capital Region of Denmark. Data was exported to IBM's Statistical Package for the Social Sciences and a chi-square test (with Yates' Continuity Correction for 2×2 tables and likelihood ratio for expected count violations) was used to test for association between failed IV access and patient condition and environmental factors.

Results A total of 200 data-sets were available for analysis and revealed no significant association between first attempt access failure and presence of radial pulse ($p=0.21$), patient triage category ($p=0.35$), size of catheter ($p=0.80$), site of catheter insertion ($p=0.11$), light ($p=0.26$) and procedure location ($p=0.31$). Significant and direct proportional association was found in first attempt access failure and assessed level of difficulty ($p=0.00$).

Conclusion The study concludes that only the paramedics own estimation of level of difficulty can be associated with first IV access success, and thereby the only one of the selected factors that can aid the paramedic in choosing between IV or IO access.

Conflict of interest None.

Funding EMS Copenhagen.

38 IMPROVING BYSTANDER DEFIBRILLATION IN OUT-OF-HOSPITAL CARDIAC ARRESTS AT HOME

^{1,2}L Karlsson*, ^{2,3}C Malta Hansen, ⁴C Vourakis, ⁵CLF Sun, ¹S Rajan, ¹K Bach Søndergaard, ²L Andelius, ²F Lippert, ^{1,6}G Gislason, ^{5,7}TCY Chan, ^{8,9}C Torp-Pedersen, ^{1,2}F Folke. ¹Department of Cardiology, Copenhagen University Hospital Gentofte, Hellerup, Denmark; ²Emergency Medical Services Copenhagen, University of Copenhagen, Denmark; ³Department of Cardiology, Nephrology, and Endocrinology, Copenhagen University Hospital Hillerød, The Region of Northern Zealand, Denmark; ⁴Human Developmental and Regenerative Biology, Harvard University, USA; ⁵Department of Mechanical and Industrial Engineering, University of Toronto, Toronto, Canada; ⁶The National Institute of Public Health, University of Southern Denmark, Copenhagen Denmark; ⁷Rescu, Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Canada; ⁸Unit of Epidemiology and Biostatistics, Aalborg University Hospital, Aalborg, Denmark; ⁹The Department of Health Science and Technology, Aalborg University, Aalborg, Denmark

10.1136/bmjopen-2019-EMS.38

Background Most out-of-hospital cardiac arrests occur at home with dismal bystander defibrillation rates (1–3). We investigated the proportion of home arrests potentially reachable with an automated external defibrillator (AED) before emergency medical service (EMS) arrival according to different bystander activation strategies.

Method We identified cardiac arrests in homes (private/nursing/senior homes) and registered AEDs in Copenhagen, Denmark (2008–2016). AED coverage (distance from arrest to AED) and accessibility at the time of arrest were examined according to route distance to nearest AED and EMS response time. The proportion of arrests reachable with an AED was calculated for two-way (from patient to AED and back) and one-way (from AED to patient) bystander response scenarios.

Results Of 1879 home arrests, AED coverage ≤ 100 m was low (6.3%) and nearly halved due to AED inaccessibility. A two-way bystander could potentially retrieve an accessible AED (≤ 100 m) prior to EMS in 31.1% ($n=37$) of cases. If a bystander only needed to travel one-way to bring an AED (≤ 100 m, ≤ 250 m and ≤ 500 m), 45.4% ($n=54/119$), 37.1% ($n=196/529$) and 29.8% ($n=350/1174$) could potentially be reached before EMS based on current AED accessibility. Assuming 24/7 AED accessibility, the proportions increased to 76.5%, 68.6%, 47.8%, respectively.

Conclusion Few home arrests would be reachable with an AED before EMS if bystanders need to travel to fetch the AED and back to the patient. However, nearly 1/3 of arrests ≤ 500 m of an AED could be reached by a bystander before EMS traveling one-way to the patient, increasing to nearly half of all home arrests if all AEDs were 24/7 accessible.

REFERENCES

- Perkins GD, Handley AJ, Koster RW, Castren M, Smyth MA, Olasveengen T, *et al*. European Resuscitation Council Guidelines for Resuscitation 2015: Section 2. Adult basic life support and automated external defibrillation. *Resuscitation*. 2015;**95**:81–99.
- Rea T. Paradigm shift: changing public access to all-access defibrillation. *Heart*. 2018;**104**(16):1311–2.
- Sun CL, Demirtas D, Brooks SC, Morrison LJ, Chan TC. Overcoming Spatial and Temporal Barriers to Public Access Defibrillators Via Optimization. *J Am Coll Cardiol*. 2016;**68**(8):836–45.

Conflict of interest Dr. CM Hansen, Dr. F Folke, and Dr. F Lippert received research grants from the Laerdal Foundation. None of the other authors reported anything to disclose.

Funding Dr. L Karlsson, Dr. CM Hansen, Dr. F Folke, and Dr. L Andelius received unrestricted funding from the private Foundation TrygFonden.