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**Conflict of interest** None

**Funding** None

76

# A NATIONWIDE WEB-BASED QUALITY REGISTRY FOR DISPATCHER-ASSISTED CARDIOPULMONARY RESUSCITATION (DACPR) OF OUT-OF-HOSPITAL CARDIAC ARREST (OHCA) – AN INNOVATIVE STRUCTURED MEASUREMENT

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10.1136/10.1136/bmjopen-2018-EMS.76

**Aim** Following the guidelines of DACPR may enhance bystander CPR rate after OHCA. Registry of quality measurement for DACPR has never been explored. We designed a nationwide quality registry for DACPR performance and innovated a structured format of measurement.

**Method** A nationwide Google Forms based online registry covering over twenty administrative regions and more than twenty millions of population was designed and launched for DACPR performance and quality measurement at individual case level for non-traumatic OHCA patient. Audio records of individual EMS call were reviewed for performance rating.

**Designs** System data inputted could be immediately retrieved as feedback to each corresponding administrative region. Recognition of cardiac arrest by call communication, CPR Instructions upon the recognised OHCA, and chest compression upon the recognised OHCA were the three major categorical performance indicators, and each operational time interval of call-to-recognition, call-to-instruction, and call-to-compression were evaluated. Each categorical performance indicator (Y axis) was paired with its operational time interval (X axis) as a set of quality index for diagrammatic comparison in our design. We used regression analysis for statistical analysis.

**Results** A total of 5642 audio records for OHCA EMS calls across 17 regions were centralised into the nationwide DACPR Quality Registry in 6 months (minimal 40 to maximal 1622 cases/region according to its population). Regional recognition rate significantly varied from 10.0% to 65.5% ( $p < 0.01$ ; averaged 51.0%, SD 20.0%). Instruction rate varied from 41.3% to 95.0% ( $p < 0.01$ ; averaged 80.0%, SD 28.5%). Compression rate varied from 0% to 87.5% ( $p < 0.01$ ; averaged 54.0%, SD 23.6%). Averaged regional call-to-recognition time, call-to-instruction time, and call-to-compression time were 48 (SD 19), 84 (SD 42), and 185 (SD 114) seconds. The designated diagrammatic comparisons may indicate the administrative regions of better performance located at the upward and leftward dimension, and the ones of unsatisfied performance located at the downward and rightward dimension (diagrams will be illustrated).

**Conclusion** We successfully innovated and launched a nationwide DACPR quality e-registry showing a wide variety of regional performance needing improvement. The designated diagram may easily indicate and compare the individual performance across the joint regions.

**Conflict of interest** None

**Funding** None

77

# OPIOID OVERDOSE DEATH IN WALES FROM 2012 TO 2015: A LINKED DATA AUTOPSY STUDY

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10.1136/10.1136/bmjopen-2018-EMS.77

We performed a retrospective autopsy study to better understand factors associated with opioid poisoning death. Using anonymised linked data we describe demographic characteristics, emergency service utilisation, and clinical presentation prior to death.

**Method** Decedents of opioid poisoning in Wales in 2015 were identified from Office of National Statistics (ONS) mortality data and their records linked with the Emergency Department data.

**Results** Age at death ranged 18 to 78 years, with a mean of 42. Average male age was 41 and average female age was 44. 76% of decedents were men ( $n=98/112$ ). 87% of decedents ( $n=112/129$ ) attended the emergency department in the three years prior to death;  $n=89$  in the previous year, 99 in the previous two years and 112 in the previous three years. 84% of male and 93% of female decedents attended the ED in the three years prior to death. There were 665 attendances, and half involved conveyance by ambulance. Attendances per individual ranged from 1 to 60, with over half of decedents attending more than three times. Diagnostic codes were mostly missing or non-specific, with only 6.5% of attendances representing 27 decedents, coded as drug related.

**Conclusion** Matching previously published data, we found that fatal opioid poisoning is preceded by a period of high emergency health service utilisation. On average decedents were in their fifth decade and more likely to be male than female. Attendances varied widely, with men less likely to attend than women.

**Conflict of interest** None

**Funding** PRIME Centre Wales

78

# IMPACT OF ADDITIONAL CALL TRIAGE TIME ON EMS RESPONSE PERFORMANCE AND RESOURCE USE

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10.1136/10.1136/bmjopen-2018-EMS.78

**Aim** Time based standards have been used as a key performance measure for EMS internationally but can lead to operational behaviours that are not clinically focussed. NHS England tested a new operational model (Dispatch on Disposition) allowing additional call triage time of up to 4 min before starting the response interval clock start.

**Method** A controlled before and after time series analysis of the intervention implemented in 6 of the 10 regional EMS services. We measured weekly trends in average resource

allocation per call and a range of time measures for different call types for 1 year before and 7 months after implementation, and used time series regression models to compare changes between intervention and control sites adjusted for seasonality, call volumes and hours lost at hospital handover.

**Results** The proportion of emergency calls responded to within 8 min increased by 6.6% in the intervention group. The 95th percentile time from call connecting to EMS and a resource arriving on scene reduced by 9.45 and 166.6 s for life-threatening and emergency calls respectively. There was a statistically significant reduction in average resources allocated per incident of -0.1 for life-threatening calls, -0.06 for emergency and -0.12 for urgent in the intervention group – equivalent to an additional 10 243 whole resources available to respond per week in England. There was no change in service re-contact.

**Conclusion** Additional call triage time does not lead to a reduction in response time performance, improves efficiency of resource use and is safe for patients.

**Conflict of interest** None

**Funding** NHS England.

79

#### WHAT IS THE ECONOMIC IMPACT OF DIFFERENT TYPES OF EMS RESPONSE?

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10.1136/10.1136/bmjopen-2018-EMS.79

**Aim** Modern EMS provides a range of response options including management by:

1. telephone,
2. management and discharge or
3. referral at scene or transport to hospital.

We used linked data of ambulance records, hospital records and national mortality statistics for all calls to one ambulance service in England in a 6 month period to assess the costs associated with each response option.

**Method** We calculated costs for each type of EMS response using the linked data and NHS Reference Costs. We then used two risk adjusted indicators measuring:

1. rates of telephone or at scene management attending ED or admitted to hospital within 3 days and
2. rates of patients taken to hospital and discharged from ED without treatment to identify matched cases of correct and incorrect response decisions to compare costs of each decision type.

**Results** 1 82 566 cases were included with 5.6% managed by telephone (mean cost £125), 28% discharged at scene (mean cost £415) and 66.4% transported to hospital (mean cost £1745). Mean cost of an incorrect transport decision was an additional £313 and an incorrect non-transport decision £237 per case.

**Conclusion** The main reason for differences in response types is inpatient costs for admitted patients. Improvement in decision making about whether or not to take people to hospital could potentially result in substantial savings in urgent care system costs.

**Conflict of interest** None

**Funding** NIHR Programme Grants for Applied Research.

80

#### DEVELOPMENT OF RISK ADJUSTED INDICATORS OF EMS PERFORMANCE AND QUALITY (PHOEBE PROGRAMME)

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10.1136/10.1136/bmjopen-2018-EMS.80

**Aim** Measurement of EMS performance and quality has been confined to response times or a small number of acute conditions and do not account for patient or system factors that may affect outcome. We developed a small set of consensus derived risk adjusted indicators to potentially measure EMS performance reflect and assessed what risk factors need to be included.

**Method** We developed 5 indicators:

1. mean change in pain score,
2. % accuracy of identification of 16 emergency conditions,
3. % inappropriate decisions to leave patients at scene,
4. % patients transported to ED not needing hospital facilities,
5. % survival to admission and 7 days for 16 emergency conditions.

We also created a linked dataset of ambulance, hospital and mortality data. For each indicator we used a 3 step process to build multivariable statistical models using a range of variables including age, gender, condition, environment (deprivation), health area and treating hospital.

**Results** 1 87 387 cases were available. One indicator (mean change in pain score) did not require risk adjustment. For all other indicators age, condition (or call reason) and deprivation were included in the final model. Gender was also included in indicators 2, 3 and 4 and hospital had an effect in indicators 4 and 5.

**Conclusion** We have created a set of indicators to reflect care for a broad range of EMS callers and care provided. Overall, a range of factors influence outcome and risk adjusted indicators are needed to provide fair and accurate assessments of performance.

**Conflict of interest** None

**Funding** NIHR Programme Grants for Applied Research.

81

#### RECRUITING LAY-PERSONS TO OUT-OF-HOSPITAL CARDIAC ARRESTS THROUGH A SMARTPHONE APPLICATION BASED RESPONSE SYSTEM

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10.1136/10.1136/bmjopen-2018-EMS.81

**Aim** Despite their lifesaving potential, automated external defibrillators (AEDs) are seldom used in out-of-hospital cardiac arrests (OHCAs). Activating lay-persons to transport AEDs to nearby OHCAs holds the potential to increase bystander defibrillation and improve OHCA survival. The 'HeartRunner'-system is a mobile-phone position system which activates lay volunteers through a smartphone application to attend in