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FP34

Are public access defibrillators disproportionately placed in affluent areas in England?
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Study purpose: Previous work has shown that out-of-hospital cardiac arrests (OHCA) occur more frequently in deprived areas of England. Public access defibrillation (PAD) is a key element of the early stages of the chain of survival. However, placement of automatic external defibrillators (AED) has been questioned and are not necessarily located where they would be most required for use. This study aimed to highlight discrepancies in the characteristics of areas where AEDs are located and not located in England.

Materials and methods: Details of 32,844 ambulance service registered AEDs were obtained. The address of each AED location was converted to a lower super output area (LSOA), the proxy unit of neighbourhood. Neighbourhood characteristics of each LSOA were obtained from the Office for National Statistics and Government websites. Comparisons were made between LSOAs with or without an AED using chi-square and t-test.

Results: AEDs were in LSOAs that were more likely to have a significantly (p < 0.01) lower residential (33.2 vs. 49.8 per hectare) but higher working (20.5 vs. 12.8) population density, have a larger white population (87.7% vs. 85.5%), be in areas with a greater proportion of groups from higher socioeconomic classifications (33.6% vs. 29.5%), and be less deprived (higher index of multiple deprivation [IMD]; Rank: 17698 vs. 15459; Decile: 5.9 vs. 5.2).

Conclusions: Whilst almost 80% of all OHCA occur in residential areas, public access AEDs are located less frequently in these areas; evidence suggests they are not clinically/cost effective in these areas. However, they are also disproportionately placed in more affluent, less deprived, areas with lower proportions of population from non-white ethnic groups. Future PAD programmes should give preference to areas where OHCA are more likely to occur and more deprived areas of the country.

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FP35

Explainable model of deep learning for outcomes prediction of in-hospital cardiac arrest patients
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Introduction: Deep learning has outperformed traditional methods in predicting healthcare outcomes. However, deep learning models struggle with explainability and are considered a black box. This article demonstrated the output from Shapley additive explanations (SHAP) analysis can provide meaningful insight into a model's predictions.

Methods: Starting from Taiwan National Health Insurance Research Database, we selected adult people (>20 years) experienced in-hospital cardiac arrest during 2003 to 2010, and built a dataset using de-identified claims of Emergency Department (ED) and hospitalization. Final dataset had 169,287 claims with data randomly split into 3 sections, train 70%, validation 15%, and test 15%. Two outcomes, 30-day readmission and 30-day mortality are chosen. Deep learning system was constructed by taxonomy mapping system Text2Node and multilevel hierarchical model based on Long Short-Term Memory (LSTM) architecture. Then explainable model was constructed by SHAP analysis.

Results: In SHAP analysis, overall feature weight on the full test dataset was generated to test the model explainability. For predicting 30-day mortality, medication codes had the most powerful impact with roughly 10% weight, followed by the diagnosis codes and test codes with roughly 6.5% and 6% respectively (Fig. 1a). For 30-day readmission, we found hospital stay to have the largest average impact on readmission prediction followed by medications and total cost (Fig. 1b). We notice that significantly more emphasis was placed on the hospital stay in the past number of months for readmission than for the mortality prediction.

Conclusion: To apply deep learning models in a clinical setting, model explainability is required, for both justifying the model output and providing signals of worst outcomes. We found that SHAP analysis seems to provide a meaningful explanation when adapting to a deep learning model. Future research must be performed to generate explanations on a medical code level.

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FP36

Resuscitation of the drowned person in the era of COVID-19 disease: Global consensus process for a novel approach
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Purpose: Early reversal of hypoxia through ventilations is the most effective measure to reduce mortality for the drowned person. In the COVID-19 era, there is a movement away from this...
intervention for out-of-hospital providers as resuscitation organisations update protocols and individuals become concerned about potential risk. Aquatic rescuers face a dilemma and as a result, required updated guidance.

**Methods:** Three international organisations representing aquatic rescuers requested input from their membership and a working group was formed to draft the statement. Elements were identified from the responses and for each, three features were discussed: recommendations for rescuers, interventions to improve safety, and data needed to inform practices. Consensus was achieved through an iterative process whereby an updated statement was sent to the larger membership for feedback until no major revisions were identified.

**Results:** 56 individuals with expertise in drowning resuscitation research, policy and implementation contributed from 17 countries. Eight elements were highlighted, which included development of a COVID-19 drowning resuscitation algorithm (Fig. 1), and strategies for risk mitigation, protective equipment, education and research. Data gaps identified included the rescuer's risk of becoming infected, efficacy of alternative ventilation techniques and ability of organisations to urgently implement new training programmes.

The process highlighted global differences in rescuer knowledge, skill and access to equipment which were exacerbated by region-specific pandemic concerns. Despite these, agreement was reached by generating recommendations with levels of risk that were aimed towards organisations instead of the individual rescuer.

**Conclusion:** We describe the first urgent, global consensus process by the drowning community. Through this, a resuscitation algorithm for use by aquatic organisations has been developed describing adaptations in the COVID-19 era. Although the viral threat may subside in the future, the consensus process has revealed important insights to improve the safety of rescuers who perform resuscitation in aquatic environments.

Mobile eye tracking is an objective research technique that enables researchers to investigate visual behaviour and processes directly by measuring eye movements. This may help to understand the processes that support or hinder a particular learning outcome.

The main idea of simulation based medical education (SBME) is achieving a high level of physical, environmental and psychological fidelity. Our research group elaborated Drama and Simulation Based Medical Education (DSBME) with which we targeted to increase the psychological fidelity of the simulation.

Our research compares the students’ gaze pattern to expert ALS providers’ gaze pattern. Students are divided in 2 groups by two different methodology of CAST: SBME and DSBME. Students’ gaze pattern are measured during CAST (Cardiac Arrest Scenario Teaching) situations. For patient safety reasons, eye tracking of the Experts group is measured in a simulation environment.

Our hypothesis:

• The DSBME teaching method provides a higher fidelity than the SBME.
• After coding and interpreting the eye tracking recordings, the similarity of actions and/or communication can also be verified, which confirms the similarity between the Experts Group and DSBME education.

As final results will not be available by the time of the conference, in our presentation we propose introducing

• The new educational methodology DSBME
• Our study design
• Our eye tracking data.

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