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PREHOSPITAL CARE AND ROAD SAFETY

Developing Sustainable Prehospital Care for NCD Emergencies in Rwanda: A Collaboration between EMS, Ministry of Health of Rwanda, and Virginia Commonwealth University

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Introduction: Every year, 71% of all deaths globally are due to NCDs. Over 85% of these deaths occur in low- and middle-income countries (LMICs), with 36% of all reported deaths in Rwanda attributed to NCDs. Approximately 24 million lives are lost each year in LMICs due to emergency medical conditions. The collaboration between VCU and the EMS Rwanda designed and implemented a pre-hospital medical emergencies training course and train-the-trainers program to address the rise of NCDs.
Methods: During the course, pre and post 50 assessment questions were administered. Two cohorts participated 25 prehospital staff identified by EMS to form an instructor core and 19 emergency staff from public hospitals who are likely to respond to local emergencies in the community. A two-day EMCC was developed using established best practices. The Instructor core completed EMCC 1 and a one-day educator course and then taught the second cohort (EMCC2). Student's t-test and matched paired t-tests were used to evaluate the assessments.
Results: Mean score on EMCC 1 was 43% (SD: 20) compared to 85% (SD: 5) on post-course assessment. Pre-assessment failure rate was 88%. Mean scores for EMCC 2 were 45% (SD: 14) and 81% (SD: 10) on post-assessment. Pre-assessment score was low (50%). A paired t-test comparing pre-course to post-course assessment means demonstrated an increase by 42% (SD 30) for EMCC 1 ($p<0.001$) and 37% (SD: 14) for EMCC 2 ($p<0.001$) with 95% confidence. No items had to be removed from analysis based on the discrimination index (di).
Discussion: NCDs often present as emergencies such as myocardial infarction and stroke. Effective management of these in the prehospital setting is essential to optimal outcomes. This study effectively implemented a training program in Kigali, Rwanda and created an instructor core to allow scale-up of effective pre-hospital services across the country.

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Getting There: Evidence-Based Decision-Making in Road Trauma Prehospital Transport and Care in Queensland

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Introduction: Process mining, a branch of data science, aims at deriving an understanding of process behaviors from data collected during executions of the process. In this study, we apply process mining techniques to examine retrieval and transport of road trauma patients in Queensland. Specifically, we use multiple datasets collected from ground and air ambulance, emergency department, and hospital admissions to investigate the various patient pathways and transport modalities from accident to definitive care.
Aim: The project aims to answer the question, "Are we providing the right level of care to patients?" We focus on (i) automatically discovering, from historical records, the different care and transport processes, and (ii) identifying and quantifying factors influencing deviance from standard processes, e.g. mechanisms of injury and geospatial (crash and trauma facility) considerations.
Methods: We adapted the Cross-Industry Standard Process for Data Mining methodology to Queensland Ambulance Service, Retrieval Services Queensland (aero-medical), and Queensland Health (emergency department and hospital admissions) data. Data linkage and "case" definition emerged as particular challenges. We developed detailed data models, conduct a data quality assessment, and preliminary process mining analyses.
Results: Preliminary results only with full results are presented at the conference. A collection of process models, which revealed multiple transport pathways, were automatically discovered from pilot data. Conformance checking showed some variations from expected processing. Systematic analysis of data quality allowed us to distinguish between systemic and occasional quality issues, and anticipate and explain certain observable features in process mining analyses. Results will be validated with domain experts to ensure insights are accurate and actionable.
Discussion: Preliminary analysis unearthed challenging data quality issues that impact the use of historical retrieval data for secondary analysis. The automatically discovered process