C2E2SPOTLIGHT

CENTRE for Clinical Epidemiology and Evaluation

February 12, 2024

Rethinking Cardiac Arrest Research With a Causal Inference Perspective to Support Transformative Technology Innovation

For approximately 30 years since the introduction of the American Heart Association Chain of Care in 1992, efforts to increase survival from Out-of-Hospital Cardiac Arrest (OHCA) have been organized around a shared framework outlining the important steps in recognizing, treating, and recovering from OHCA. During the same period, OHCA researchers have designed and implemented a range of public health, treatment, and recovery focused programs that have appeared to increase survival and quality of life for treated OHCA based on the results of analyses of observational registry data.

However, in spite of these innovations, survival following OHCA for all cases remains low, about 5-7% when considering all treated and untreated cases. A major contributor to this high mortality is the fact that about 50% of OHCA cases receive treatment, with the other half determined to be futile by attending first responders due to a significant interval between the onset of cardiac arrest and discovery of the case. The majority of OHCA research does not consider these untreated cases, and data is usually only collected on the approximately 50% of cases which receive treatment from first responders, due to resource limitations in observational registries. It is clear that recognition and treatment are key factors to consider when organizing any effort to improve survival from OHCA.

To support interdisciplinary efforts to develop, test, and implement novel technologies to increase OHCA recognition, we sought to investigate the potential gains in survival resulting from intervening on previously unwitnessed cases with a technology that would enable early recognition, thus influencing the proportion of cases that receive treatment from first responders, and ultimately survival. This analysis is one of the first and only analyses to construe treatment as a mediator in a causal pathway between recognition and survival, thus identifying a previously underestimated opportunity to increase survival by impacting treatment.

Efforts to properly define and estimate the impact of novel technologies that increase recognition on survival will be discussed. I will highlight the utility of a causal perspective in understanding the impact of new technologies using observational data, as well as discuss how a causal perspective has allowed our team to properly define the potential for these technologies, and how this has influenced efforts to develop and validate physical technologies for OHCA detection.

Presenter	**Jacob Hutton, PhD(c)** UBC Department of Emergency Medicine, BC Resuscitation Research Collaborative, BC Emergency Health Services

C2E2 Spotlight is held monthly on Mondays from 12:00 pm to 1:00 pm. To attend in-person or virtually please contact pamela.lee@ubc.ca.