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The Sun Herald Sydney City-2-Surf Fun Run: Historical Injury Patterns and Development of a Predictive Model to Inform Health Service Planning

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Introduction: The Sydney City-2-Surf is the world's largest annual run entered by around 80,000 people. First aid planning at mass participation running events such as the City-2-Surf is an area in the medical literature that has received little attention. Consequently, first aid planning for these events is based on experience rather than evidence. The models for predicting casualties that currently exist in the literature are either dated or not statistically significant.

Aim: The aim of this study was to characterize patterns of injuries linked to geographic location across the course of the City-2-Surf, and to explore relationships of injury types with location and meteorological conditions.

Methods: Records for formally treated casualties and meteorological conditions were obtained for the race years 2010–2016 and statistically analyzed to find associations between meteorological conditions, geographic conditions, casualty types, and location.

Results: The most common casualties encountered were heat exhaustion or hyperthermia (39.2%), musculoskeletal (25.4%), and physical exhaustion (10.2%). Associations were found between gradient and the location. Type of casualty incidence with the individual distribution trends of casualty types were quite clear. Clusters of musculoskeletal casualties emerged in the parts of the course with the steepest negative gradients, while a cluster of cardiovascular events was found to occur at the top of the 'heartbreak hill,' the longest climb of the race. Regression analysis highlighted the linear relationship between the number of heat and physical exhaustion casualties and the apparent temperature (AT) at 12pm ($R^2 = 0.59$, $P = 0.044$). This linear equation was used to formulate a model to predict these casualties.

Discussion: The findings of this study demonstrate the relationship between meteorological conditions, geographic conditions, and casualties. This will assist planners of other similar events to determine optimum allocation of resources to anticipated injury and illness burden.

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This is Sparta - A Five-Year Obstacle Course Racing Injury Analysis

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Introduction: Obstacle Course Races (OCR) are mass participation sporting events, challenging participants to complete physical and mental tasks over a variety of distances and terrains. The case series studied, Spartan Race, has races occurring in urban, rural, and wilderness venues, ranging from 5 to 42 kilometers, while incorporating 20 to 60 obstacles.

Aim: To understand the injury rates, injury and illness patterns, and transport considerations within OCRs.

Methods: A secondary data analysis of de-identified medical charts from 56 Spartan Race events occurring in Eastern Canada from 2014 to 2018 was performed. The scope of practice was first aid from 2014 to 2017, with the addition of advanced life support onsite in 2018.

Results: Over 5 years, 2,387 injuries occurred among 127,481 participants, creating a patient presentation rate of 18.7/1000. Although the majority of injuries (92%; $n = 2,204$) were treated onsite, a transport to hospital rate of 1.2/1000 ($n = 154$) occurred along with an ambulance transport rate of 0.23/1000 ($n = 29$). Lacerations (55%) and musculoskeletal (36%) injuries were the most frequent clinical presentations observed, whereas life-threatening emergencies (affecting airway, breathing, and circulation) were infrequent ($n = 10$). Transport to the closest local tertiary care center was on average 49.8 kilometers (25.3 kilometers) and 40.5 minutes (17.9 minutes) away from the venue.

Discussion: These results suggest that there may be an upper limit to the injury rates within Spartan Races. The majority of patient presentations were able to be treated onsite, supporting the need for a qualified onsite medical team to mitigate the strain on local healthcare systems. Although life-threatening emergencies were uncommon, they do occur, and medical teams must be appropriately prepared. Further research is needed to understand the staffing and equipment requirements of medical teams, the demographic information of the injured, and the examination of the impact OCR events have on the local health care systems.

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