

Incidence of out-of-hospital sudden cardiac arrest at exercise and sport facilities in Queensland, Australia



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Aim: Exercise and sport facilities (ESF) contribute to the preventive health policy of the governments by helping people to be more physically active. Hence, vigorous exercise can be a trigger for sudden cardiac arrest (SCA) in people with known or hidden cardiovascular conditions. There is a lack of evidence about the incidence of SCA at ESF in Australia that can be used to develop better risk management strategies in the sport and fitness sectors. The aim of this study was to analyse the incidence rate (IR) of out-of-hospital SCA (OHSCA) at ESF in Queensland, Australia.

Methods: The de-identified electronic OHSCA data was obtained from the Queensland Ambulance Services (QAS) for the eight year period between 2007 and 2015. The data was systematically extracted, coded and categorised before statistical analysis in SPSS version 24. The OHSCA incidence rating (IR) for each type of ESF was standardised per 10,000 participants according to possible user data in Queensland obtained from the Australian Bureau Statistics¹. The formula used to calculate the IR score for each ESF is outlined below.

$$IR = \frac{\text{Number of OHSCA at an ESF}}{\text{Population at an ESF}} \times 10,000$$

This study was approved by the Central Queensland University Human Research Ethics Committee (Approval Number: H15/06-138).

¹Australian Bureau of Statistics. (2012). Participation in Sport and Physical Recreation, 2011-12. Table Builder, Secure Web Log-in. Findings based on use of ABS Microdata.

Results: There were 250 OHSCA cases in ESF after exclusions (e.g. vehicle trauma, home, <18 years old) and key word search by type of sport. Potential cases were manually reviewed by street address for relevance. Most of the SCA patients were male (n=187, 86.6%) and aged ≥65 (n=91, 42.1%) (Table 1). The sites with highest incidence of OHSCA were golf clubs (n=41), health/fitness facilities (n=29), licensed sports clubs (n=23), lawn bowls clubs (n=22), and tennis clubs (n=17) (Figure 1). The highest risk sites for an OHSCA were motorsports clubs (IR=8.5), lawn-bowls clubs (IR=7.1), squash centres (IR=4), golf clubs (IR=2.9), and tennis clubs (IR=1.9) (Figure 2). The average time it took for the paramedics to arrive on scene was 8.74 minutes (95%CI:7.85,9.62, range=48) with no significant difference across geographic locations (p<.05).

Table 1. Characteristics of OHSCA cases at ESF.

	n	%
Gender		
Female	32	12.8
Male	218	87.2
Age category		
18-24 years old	4	4
25-34 years old	10	8.8
35-44 years old	22	16
45-54 years old	40	19.6
55-64 years old	49	36.4
65 years old and over	91	86.4
Season		
Autumn	75	30
Spring	47	18.4
Summer	58	23.2
Winter	69	27.6
Geographic location		
Metropolitan cities	139	55.6
Inner regional	73	29.2
Outer regional	38	15.2

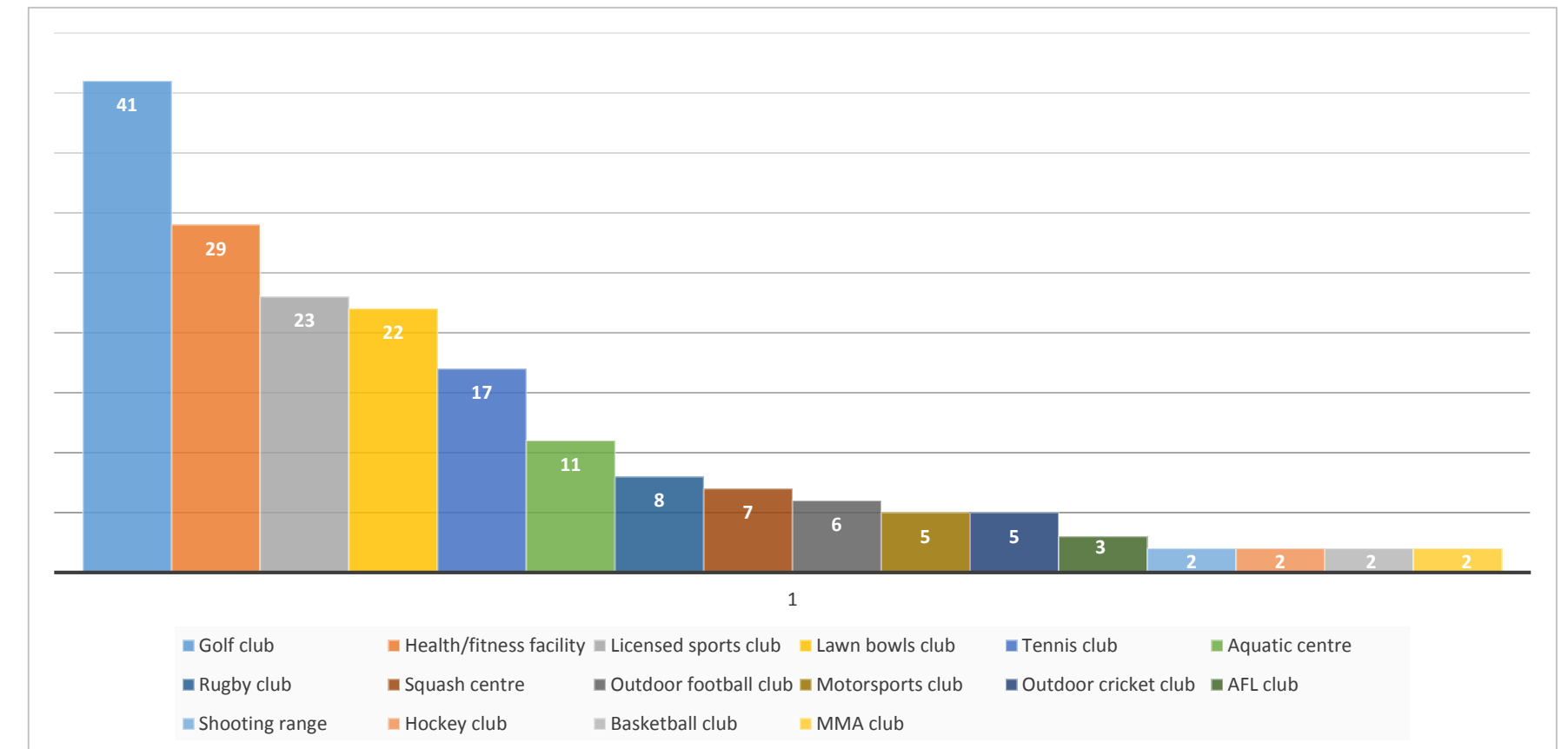


Figure 1. Number of OHSCA at ESF.

Note. Only ESF with more than one (1) OHSCA incident have been listed.

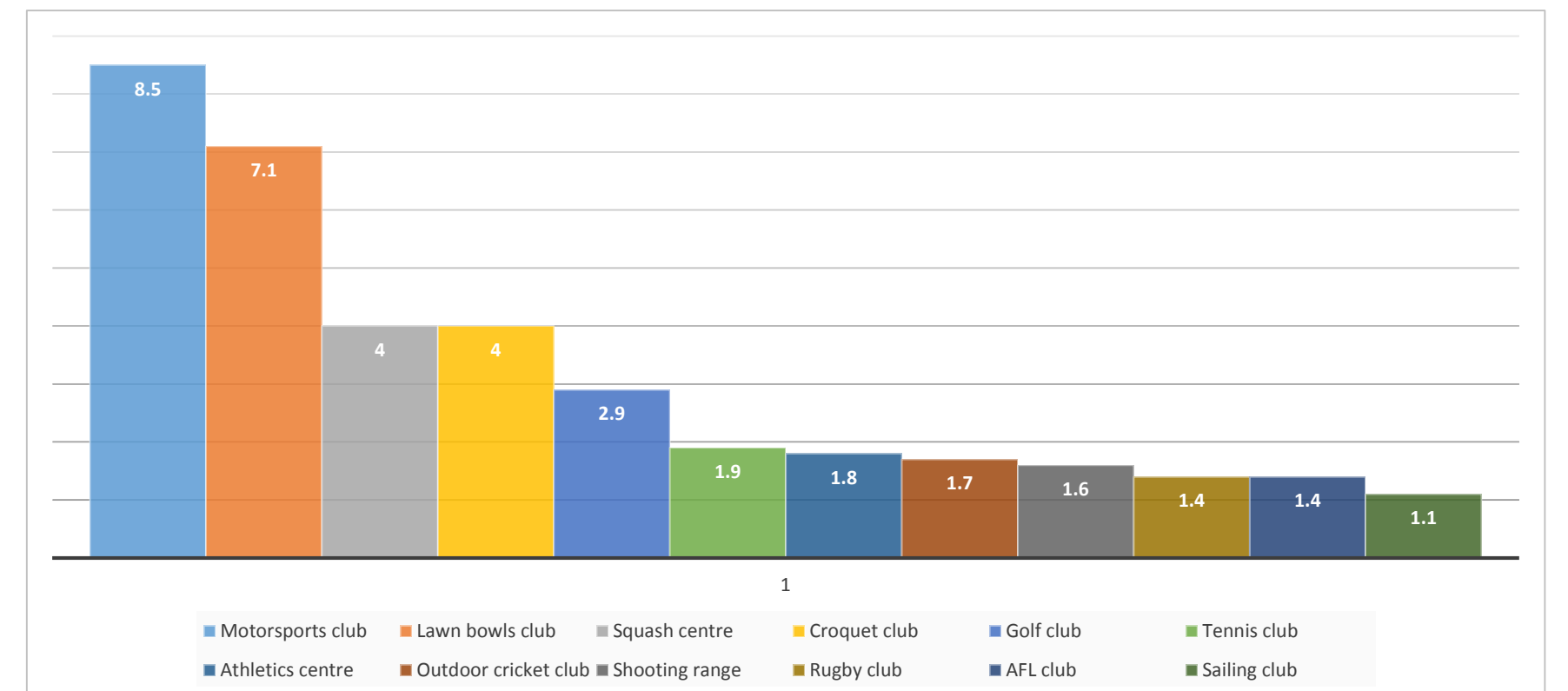


Figure 2. Incidence rate (IR) of OHSCA at ESF per 10,000 people.

Note. Only ESF with an IR higher than 1 have been listed.

Conclusions: The ESF operators have a duty to ensure the health/safety of their participants by implementing medical emergency plan (MEP) and procedures that include timely recognition, calling emergency medical services, early cardiopulmonary resuscitation (CPR) and early defibrillation when a cardiovascular event occurs. This study has policy implications for the ESF and sport governing organisations to revise their MEP and identify their need to utilise automated external defibrillators (AED) that can help to improve OHSCA outcomes.