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CLINICAL FEATURE  
LETTER TO THE EDITOR

## Regarding sudden cardiac death in soccer players

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To the Editors,

In reading the recent article by Davogustto and Higgins [1], we appreciated the effort in compiling 54 cases of sudden cardiac death (SCD) in soccer players over a 13-year period. Soccer is a worldwide sport with millions of participants and the issue of SCD is an important one. In the article, the authors state the incidence of sudden death by position on the soccer field (op. cit., page 24) and reported that midfielders had the most cases of SCD, followed by defenders, strikers and goalkeepers. The authors offered a possible explanation for the high occurrence in midfielders because they “cover more distance during a soccer match and also (midfielders) cover the greatest distance in high-intensity running distance compared with attackers and defenders.” (op. cit., page 26).

We take issue with this explanation in several ways. The main problem with their hypothesis (and major limitation of the paper) is a lack of a true denominator. The authors falsely assume that each position has an equal chance of sudden death. In actuality, each position is not at equal risk because teams do not have equal numbers of goalies, defenders, midfielders and strikers. We conducted a search of five geographically different professional leagues to determine the percentages of each of the respective positions. We selected the English Premier League [2], Spanish La Liga [3], Japanese J league [4], the United States Major League Soccer [5] and the Brazilian First Division [6] and the results are presented in Table 1. The roster distributions of these global

leagues were also compared to the distribution of SCD, as reported by Davogustto and Higgins (Figure 1). This clearly demonstrates that the percentages of sudden death in the referenced article are almost identical to the percentages of players by position in the five leagues. A better explanation for the authors’ findings is that the incidence of sudden death reflects the relative percentages of players at each of the respective positions. The authors’ explanation of extensive running being a potential causative factor is also contradicted by the fact that 12% of the SCD cases occurred in goalies who do not run extensively during matches. Their conclusion about position being a risk factor for SCD is not supported by their data and we worry that both the public and the scientific community will misinterpret their study.

In addition to neglecting the denominator of position, the major limitation of the paper is the lack of a total denominator that would allow for a true incidence of SCD in this population. It appears from the article that the authors only considered cases of SCD that occurred in players who were part of organized teams. Most soccer-playing countries have statistics on the number of organized players and this could have provided a rough denominator. The authors also reported on the continent of origin for each SCD case and knowledge of how many organized soccer players by continent would have allowed for interpretation of these statistics. It is known that certain populations have different causes of SCD (e.g. Italy, and have taken steps to reduce it) and the authors could have explored this [7].

Table 1. Number of field players during matches according to their position.

Federation	Defenders	Midfielders	Strikers
UEFA (n = 10)	4.1 ± 0.31	3.5 ± 0.97	2.4 ± 0.84
CONMEBOL (n = 10)	4.2 ± 0.78	3.6 ± 1.17	2.2 ± 0.63
CONCACAF (n = 10)	4.2 ± 0.91	3.8 ± 1.22	2 ± 0.94
CAF (n = 7)	4 ± 0.57	4 ± 1.29	2 ± 0.81
AFC (n = 10)	3.8 ± 0.91	4 ± 1.41	2.2 ± 0.78
Total (n = 47)	4.06 ± 0.73	3.76 ± 1.18	2.17 ± 0.78

Data presented as mean ± standard deviation.

Abbreviation: AFC = Asian Football Confederation; CAF = Confédération Africaine de Football; CONCACAF = The Confederation of North, Central America and Caribbean Association Football; CONMEBOL = Confederación Sudamericana de Fútbol; UEFA = Union des associations européennes de football.

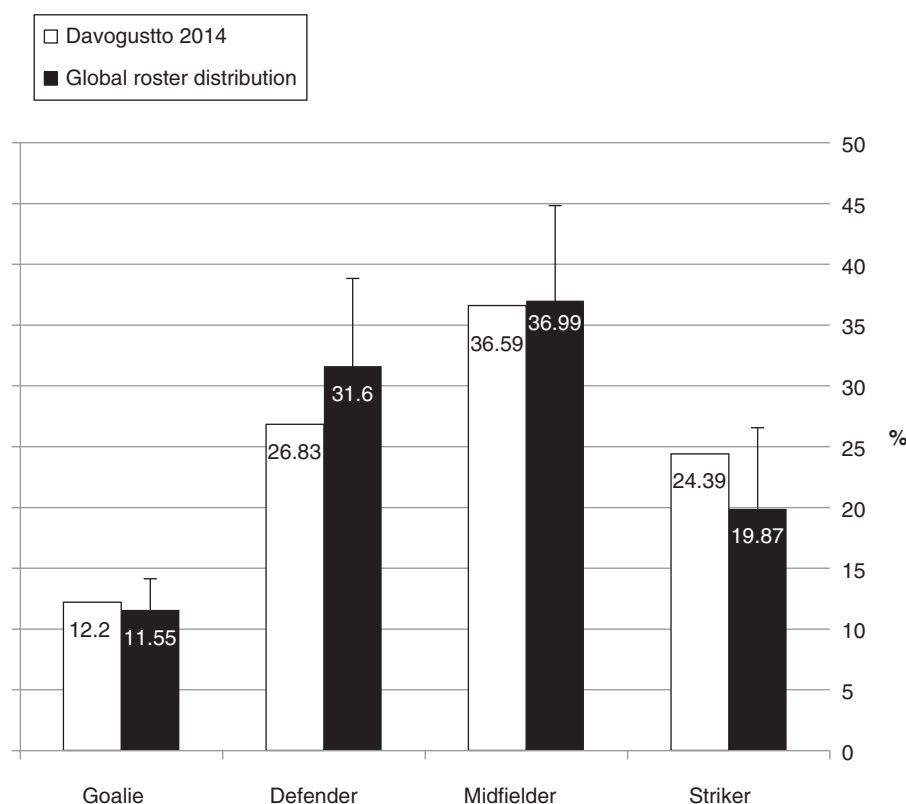


Figure 1. Comparison of sudden cardiac death events distribution according to player's field position to distribution of field players during soccer matches in 47 worldwide teams.

Data presented as percentage, with standard deviation when available.

The authors should be congratulated on their work in bringing this serious topic to the forefront, but we would recommend the use of denominators in order to improve the impact on the literature.

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### Declaration of interest

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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