Classification of middle- and long-distance runners based on their competition results

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INTRODUCTION:
The scientific literature lacks consensus on classification of middle- and long-distance runners. Many terms are used to describe the proficiency level of athletes. This creates situations where the sample studied may not represent the target population and could produce misleading results. Thus, we present an approach for a data-driven classification of middle- and long-distance runners according to their competition results.
METHODS:
The best annual results of middle- and long-distance track runners participating at major (Olympics, World and European Championships) and national championships (Denmark, Sweden, Finland, Norway) were gathered for the 2012–2018 period. The results were grouped accordingly. Quadratic discriminant analysis was applied to define the limits between the groups.
RESULTS:
Three basic categories could be proposed for classification: world class, international and national. The performance-based approach for classification provide value necessary for population descriptions in scientific research and elsewhere. Classification provides a realistic overview on performance standards and the number of athletes for different categories in middle- and long-distance track running in real-world settings.
CONCLUSION:
The developed classification has the potential to improve the quality of scientific research and has applications in the effective planning of anti-doping testing. The present classification may further require regular upgrades to meet the demands of the constantly changing sport.

Topic: **Statistics and Analyses**

Presentation   **Poster**

5332