Reviewer's report

Title: Will the age of peak ultra-marathon performance increase with increasing race duration?

Version: 1 Date: 14 July 2014

Reviewer: Jonathon Senefeld

Reviewer's report:

Comments to Authors

This study accessed public data to describe how age- and sex-related performance of the ultra-marathon changed in duration-limited races from 6 hours to 10 days. The central purpose of this study was to test the hypothesis that the age of peak ultra-marathon performance would increase with longer duration races. Although the authors have a straightforward central question, the approach of the manuscript encompasses a breadth of data that is disconnected from the stated purpose of the manuscript. Overall, the manuscript is not systematic in developing the question or demonstrating the results; however, this is a result of superfluous text and can be rectified.

Below, there are several comments intended to improve the quality and impact of the manuscript. The comments are written by section for clarity.

Discretionary Revisions:

General comments:

1) Examining the age of ultra-marathon runners in years across the history of an event in years requires careful wording in order to maintain clarity of the text, it may be helpful to ascribe the phrase “years” to a person’s age and “years of competition” to the history of an event.

Background:

2) The last sentence in paragraph 2 is unclear. Consider adding a phrase to the effect of “no changes across years of competition” for clarity.

Tables and Figures

3) It may be useful to highlight the significant P-values in tables by using bold font.

4) Consider removal of figure 2 or figure 3- both figures represent quite similar messages.

Minor Essential Revisions:
General comments:

5) Consider revision of sentences that use the same word with different suffixes. (e.g. performance increase with increasing race duration)

6) The authors conclude that the age of ~40-50 years seems to be optimal for ultra-marathon performance (e.g., abstract and discussion); however, in the last paragraph of the results the authors demonstrate the ages of the fastest men and women began at 35 years for race durations observed in this study. Given this is, in part, the answer to the question proposed in the title, it seems misleading to suggest that optimal performance is between 40-50 years.

Background:

7) In paragraph 3, there is a brief discussion regarding the change in the age of the annual fastest swimmers of the Manhattan Island Marathon swim across several years of competition which distracts from the main purpose of the introduction and paper. Please remove this text.

Results:

8) The second paragraph of the results regarding the number of events across the years of analysis does not add to the message of the manuscript. Consider removing this paragraph and figure 1.

9) In paragraph 4 of the results, the first sentence is vague. Revise and include, in detail, the distribution that is being referenced.

10) In paragraph 7 (of the results), please include that this text is referring to the first fastest women and men; otherwise this text seems contradictory to the following paragraph regarding the top 10 women and men.

Discussion:

11) The first section of the discussion “increase in events and finishers” is not considered in the three points referencing the ‘important findings’ of the manuscript, and this data distracts from the intent of the manuscript. Removal of this text would improve clarity of the discussion.

Major Compulsory Revisions: 

Background:

12) General comment regarding the background section- this section could be stated more concisely. Information regarding changes in performance across different years of competition and specific distances of triathlons that are simply a factor of the Olympic distance (e.g., triple) is superfluous. Please modify.

Methods:
Although it is explicitly written that in the text are given as mean ± SD, there seems to be no reference to the presentation of data in the figures and tables in the manuscript text or legends. Please include.

**Results:**

14) Paragraph 5 and the next several paragraphs begin with a sentence that should appear as a legend for the respective figures, rather than the introduction to a paragraph.

**Discussion:**

15) The 5th paragraph of the discussion comparing findings from the 12- and 24-hour races in Switzerland with previous results from Hoffman and Wegelin should be revised. This paragraph compares age of peak performances in a set of races (12- and 24-hour) with the average age of all participants from a different race. The comparison being made is not clear. Please clarify or remove text.

16) The text regarding the physiology of aging and determinants of aerobic performance is a nice addition to the discussion; however, the authors do not clearly link this text to the discussion. Please clearly link this text to the discussion, I think this discussion is valuable. Particularly because 'a loss of muscle fibres begins at the age of ~50' which corresponds to the upper limit of the age of peak performances in ultra-marathons demonstrated in this manuscript.

**Tables and Figures**

17) The central question and title of the paper- “will the age of peak ultra-marathon performance increase with increasing race duration?”- is not represented well in the figures. The title and purpose allude to a graphical comparison of race duration and age of the best performers- which is not present. Please include a graph to this effect.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.