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## Letter to the Editor re: Risk of Prostate Cancer in Pilots: A Meta-Analysis

Dear Editor:

The recent meta-analysis by Raslau et al.<sup>3</sup> intended to compare the incidence of prostate cancer in pilots relative to the general population. However, their analysis is seriously flawed by virtue of including inappropriate data from two studies that should be ineligible, as they do not report the incidence of prostate cancer in aviators. Additionally, other data included in the meta-analysis have been duplicated.

Both del Junco et al.<sup>1</sup> and Yamane<sup>5</sup> examine prostate cancer incidence in all USAF servicemen compared to the general population. Data for aviators are not reported, so both are therefore ineligible for the Raslau et al.<sup>3</sup> meta-analysis. Worse, the del Junco et al. paper, a single study evaluating the incidence of prostate cancer in the USAF over successive 5-yr time periods, is misrepresented in the Raslau et al. meta-analysis as six pilot-control group comparisons. Consideration of their Forest plot indicates that this has clearly biased the outcome. By including these studies, Raslau et al. imply that the incidence of prostate cancer is increased significantly in USAF aviators when there is good evidence that it is not.<sup>4</sup> Finally, the Pukkala et al.<sup>2</sup> study is a form of meta-analysis concerning Nordic airline pilots; its inclusion in the Raslau et al. meta-analysis duplicates data included from four other studies. These simple mistakes call into question the rigor with which the studies were reviewed by the authors and the thoroughness of peer review, which has missed these errors.

Raslau et al. conclude that “pilots are at least twice as likely to develop prostate cancer compared to the general population.” This is not supported by the evidence they have drawn upon. Excluding the del Junco et al., Yamane, and Pukkala et al. data for the reasons outlined above results in a slight but statistically nonsignificant increase in relative risk in pilots. Risk ratio meta-analysis conducted on the remaining data using a random effects model estimates the relative risk at  $\sim 1.25$  ( $P > 0.1$ ) based on 134 observed cases of prostate cancer (107 expected) in 14,927 pilots over 307,751 person-years of observation. On this basis, we should have less than 90% confidence that some pilots might possibly have a  $\sim 25\%$  increased risk of developing prostate cancer compared to the general population.

The power of meta-analysis obliges the utmost care when selecting input data and circumspection when reporting dramatic outcomes. Publication of Raslau et al. misrepresents the evidence and risks masking the truth, whether that is no real increase in risk of prostate cancer in men who fly for a living, or a genuine but less dramatic increase in risk that remains to be validated. As it stands, Raslau et al. may lead many male aviators wrongly to believe that they are twice as likely to suffer prostate cancer as their Earth-bound brothers.

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### REFERENCES

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2. Pukkala E, Aspholm R, Auvinen A, Eliasch H, Gundestrup M, et al. Incidence of cancer among Nordic airline pilots over five decades: occupational cohort study. *BMJ.* 2002; 325(7364):567.
3. Raslau D, Summerfield DT, Abu Dabrh AM, Steinkraus LW, Murad MH. The risk of prostate cancer in pilots: a meta-analysis. *Aerosp Med Hum Perform.* 2015; 86(2):112-117.
4. Rogers D, Boyd DD, Fox EE, Cooper S, Goldhagen M, et al. Prostate cancer incidence in U.S. Air Force aviators compared with nonaviators. *Aviat Space Environ Med.* 2011; 82(11):1067-1070.
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### In Response:

It was recently brought to my attention that Dr. Connolly believes that some of the articles included in my meta-analysis should have been excluded. Upon reviewing the concerns he expresses in his above Letter to the Editor and reexamining the

articles in question, I found that these claims are, in fact, correct. I wish to make it clear that this response letter is not trying to excuse the mistake that occurred. Rather, I simply want to offer an explanation for how this happened.

This mistake was made because of my inexperience with the subject matter. I was at the infancy of my training in Aerospace Medicine and unfortunately had no prior familiarity with these topics. When I began working on this research project, the phrase "Air Force servicemen" seemed equivalent to the term pilots to me. Now after having completed training in this field,

I can easily see the folly of this assumption. Sadly, it was not so evident back then.

I have asked for the article to be retracted. I do not want to perpetuate imprecise conclusions based on faulty data. As Dr. Connolly says in his letter, "the utmost care" is needed when performing a meta-analysis. I will take this lesson to heart and will strive to not repeat my mistake in the future.

David Raslau, M.D.

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## Retraction

Raslau D, Summerfield DT, Abu Dabrh AM, Steinkraus LW, Murad MH. *The risk of prostate cancer in pilots: a meta-analysis*. *Aerosp Med Hum Perform*. 2015; 86(2):112–117.

The authors have requested that the above-mentioned article be retracted. The analysis is seriously flawed by virtue of including inappropriate data from two studies that should be ineligible, as they do not report the incidence of prostate cancer in aviators. Additionally, other data included in the meta-analysis has been duplicated. We apologize for this error.

Frederick Bonato  
Editor-in-Chief  
*Aerospace Medicine and Human Performance*