

Please log onto Editorial Manager at <http://asem.edmgr.com> to submit your letters to the editor. If you have not already done so, you will need to register with the journal.

Letter to the Editor re: Prostate Cancer in Pilots

Dear Editor:

The second meta-analysis on prostate cancer among pilots by Raslau et al. was published in June last year;¹⁶ the first meta-analysis by the same authors was published in February 2015.¹⁷ The first study¹⁷ was criticized by Connolly the same year⁶ for including inappropriate data from two studies on U.S. Air Force servicemen when it was intended to study pilots, and for including duplicate data as the joint analysis on Nordic pilots by Pukkala et al.¹³ also included cohorts from four national studies.^{8,9,12,14} Raslau and coworkers were praised in an ethical paper³ for retracting their first paper.^{15,17} In the second attempt these errors were corrected;¹⁶ however, new mistakes were made and some former mistakes were repeated.

In the Methods section it says that literature was searched until August 2015,¹⁶ but the authors failed to include two recent mortality studies published in 2014.^{10,18} The study of Hammer and coworkers is a large mortality study of nine European cohorts of pilots,¹⁰ but earlier analysis of nearly the same group of researches⁴ were strangely not included in the first meta-analysis of Raslau et al.¹⁷ These joint analyses of the ESCAPE studies^{4,10} include the pilots of the Italian¹ and the German¹¹ cohorts, and the later ESCAPE study with longer follow-up¹⁰ would have been appropriate in the meta-analysis. The first study of the Canadian pilots² is missing in both analyses of Raslau and coworkers (however, included in the reference list of both meta-analyses^{16,17}), as well as a large study of U.S. airline pilots.⁵ It is of interest to know if these studies were considered and, if so, why they were omitted from the meta-analyses.^{16,17}

Raslau and coworkers do not mention what keywords or combinations they used when they or their librarians were searching the literature.^{16,17} However, it can be seen from the flowchart of the selection process in the later article¹⁶ that the studies obtained had been primarily divided into incidence and mortality studies. The description of the procedure about the study strategy have nearly exactly the same wording in the Methods of the two publications.^{16,17} The only noteworthy difference is the date of the end of the literature search.^{16,17} In the flowchart it is stated that the studies involved met inclusion criteria, however, these criteria are never explained.¹⁶

Table II shows the quality assessment in the later publication of Raslau et al.¹⁶ and here there is some lack of precision. There is confusion between Hammar and Hammer, the study of Hammer et al.¹¹ is included in the meta-analysis, but not the study of Hammar et al.,¹² and there is an exaggeration in the footnote of the table.¹⁶

It is a pity that the selection of the studies for the meta-analysis is still all in a mess,¹⁶ and that the description of the selection process is so deficient that it is not possible point out what exactly went wrong.

Finally, one may wonder whether it is a good idea to combine pilots from military and commercial/civilian services in a meta-analysis or whether the different services are better evaluated separately. In one of the studies of pilots which dealt with both types of pilots, it was discussed whether such a combination was appropriate because of differences between military and commercial airline pilots regarding types of aircrafts, and duration and altitude of the flights.¹² Furthermore, the military and the airline pilots were assumed to have different lifestyles.¹²

This letter is written because of a desire for a correctly conducted and robust meta-analysis of prostate cancer among airline pilots. The 5-year survival rate for cancer of the prostate during the last 15 years in developed countries has been 80 to 90%,⁷ and recognition of that fact would be welcome in the discussion of the meta-analysis.

Vilhjalmur Rafnsson, M.D., Ph.D

*Department of Preventive Medicine, Faculty of Medicine
University of Iceland, Reykjavik, Iceland*

REFERENCES

1. Ballard TJ, Lagorio S, De Santis M, de Angelis G, Santaquilani M, et al. A retrospective cohort mortality study of Italian commercial airline cockpit crew and cabin attendants, 1965–96. *Int J Occup Environ Health*. 2002; 8(2):87–96.
2. Band PR, Spinelli JJ, Ng VTY, Math M, Moody J, Gallagher RP. Mortality and cancer incidence in a cohort of commercial airline pilots. *Aviat Space Environ Med*. 1990; 61(4):299–302.

Reprint & Copyright © by the Aerospace Medical Association, Alexandria, VA.

DOI: <https://doi.org/10.3357/AMHP.4868.2017>

3. Benson PJ. Seven sins in publishing (but who's counting?). *Ann R Coll Surg Engl*. 2016; 98(1):1–5.
4. Blettner M, Zeeb H, Auvinen A, Ballard TJ, Caldora M, et al. Mortality from cancer and other causes among airline cockpit crew in Europe. *Int J Cancer*. 2003; 106(6):946–952.
5. Cashman JP, Nicholas JS, Lackland D, Mohr LC, Woolson RS, et al. Mortality among airline pilots in the United States. *Int J Appl Aviat Stud*. 2007; 7(2):202–211.
6. Connolly DM. Letter to the editor re: risk of prostate cancer in pilots: a meta-analysis. *Aerosp Med Hum Perform*. 2015; 86(5):490–491.
7. Engholm G, Ferlay J, Christensen N, Kejs AMT, Hertzum-Larsen R, et al. NORDCAN: cancer incidence, mortality, prevalence and survival in the Nordic Countries. Version 7.3 (08.07.2016). Association of the Nordic Cancer Registries. Danish Cancer Society; [Accessed 3 Mar. 2017]. Available from <http://www.anccr.nu>.
8. Gundestrup M, Storm HH. Radiation induced acute myeloid leukaemia and other cancers in commercial jet cockpit crew: a population-based cohort study. *Lancet*. 1999; 354(9195):2029–2031.
9. Haldorsen T, Reitan JB, Tveten U. Cancer incidence among Norwegian airline pilots. *Scand J Work Environ Health*. 2000; 26(2): 106–111.
10. Hammer GP, Auvinen A, De Stavola BL, Grajewski B, Gundestrup M, et al. Mortality from cancer and other causes in commercial airline crews: a joint analysis of cohorts from 10 countries. *Occup Environ Med*. 2014; 71(5):313–322.
11. Hammer G, Blettner M, Langer I, Zeeb H. Cosmic radiation and mortality from cancer among male German airline pilots: extended cohort follow-up. *Eur J Epidemiol*. 2012; 27(6):419–429.
12. Hammar N, Linnarsjö A, Alfredsson L, Dammström BG, Johansson M, Eliasch H. Cancer incidence in airline and military pilots in Sweden 1961–1996. *Aviat Space Environ Med*. 2002; 73(1):2–7.
13. 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.
14. Rafnsson V, Hrafnkelsson J, Tulinius H. Incidence of cancer among commercial airline pilots. *Occup Environ Med*. 2000; 57(3):175–179.
15. Raslau D. Letter to the Editor re: risk of prostate cancer in pilots: a meta-analysis: response. *Aerosp Med Hum Perform*. 2015; 86(5): 490–491.
16. Raslau D, Abu Dabrh AM, Summerfield DT, Wang Z, Steinkraus LW, Murad MH. Prostate cancer in pilots. *Aerosp Med Hum Perform*. 2016; 87(6):565–570.
17. 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.
18. Yong LC, Pinkerton LE, Yiin JH, Anderson JL, Deddens JA. Mortality among a cohort of U.S. commercial airline cockpit crew. *Am J Ind Med*. 2014; 57(8):906–914.

In Response:

We appreciate the interest of Dr. Rafnsson in our systematic review and meta-analysis.¹ We also appreciate the dedication and continued effort by the Aerospace Medicine community (readers of this journal) to keep the evidence base about pilots' health as precise and rigorous as possible.

The topic of prostate cancer in pilots is important and the relevant literature is dynamic and evolving, with new studies being published as more groups examine this area. The Letter to the Editor points to some additional studies about the topic. These studies were not included in our analysis due to either the search date of our review or due to our interest in excluding any study that was not done exclusively in pilots (which was the challenge we had in the first meta-analysis²). Therefore, we excluded studies that described a part of their cohort as Air Force Servicemen, cabin crew, etc.) and sought to only include those that explicitly and unambiguously described their cohort as pilots. We recognized that this restrictive criterion would lead to excluding some pilots from these cohorts; however, in our second meta-analysis we were erring on the side of exclusion to be more precise when providing inferences about pilots' health. In reviewing the additional suggested studies, we note that the overall conclusion from the current evidence base remains the same. That is, pilots may have a very small relative increase in the incidence of prostate cancer (with unknown clinical significance), but they do not have an increase in prostate cancer mortality.

In future evidence-based reviews we expect potential associations and relationships to be better elucidated as the number of studies and number of studied aircrew expands.

David Raslau, Abd Moain Abu Dabrh,
Douglas T. Summerfield, Zhen Wang, Lawrence W. Steinkraus,
Mohammad Hassan Murad

REFERENCES

1. Raslau D, Abu Dabrh AM, Summerfield DT, Wang Z, Steinkraus LW, Murad MH. Prostate cancer in pilots. *Aerosp Med Hum Perform*. 2016; 87(6):565–570.
2. 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.