Authors' Response to Boivin and Savard Commentary

Dear Editor:

Risk estimates are frequently used in public health practice to guide authorities responsible for adopting policies that protect public health. There are uncertainties in all risk estimates, most of which do not invalidate their conclusions.

Boivin and Savard point out that the flight trajectories used to estimate night-time noise levels are imprecise. As stated in the methods section of our article, we used five potential aerial trajectories to account for variations associated with winds, pilot habits, air traffic control, etc. This methodology is used worldwide and supported by institutions like the European Civil Aviation Conference.[1] Furthermore, to obtain an idea of the imprecision associated with the flight trajectories, we estimated how the sleep disturbance probabilities varied for the five trajectories. The mean difference between the trajectories was less than 10% additional or fewer awakenings per night. This suggests that while the use of precise trajectories would definitely be preferable to modeled trajectories, the imprecision associated with modeled trajectories is low.

Boivin and Savard also question the methodology used to assess the number of individuals exposed to aircraft noise that could generate one or more awakenings per night. As mentioned in the discussion and in the conclusion of our paper, we agree that our analysis only roughly estimates the number of individuals exposed. Yet, in order to quantify the magnitude of the imprecision, we revised our analysis to remove the number of residences built in 2009 and afterwards and used the 2011 census data. This new analysis modified our original results by 0.1%.

In our discussion, we stated the limits to the external and internal validity of the function developed by Basner et al.[2] Thus, we agree with the limitations mentioned by the authors of the commentary. However, we disagree with their interpretation of these limitations. As presented in the article, the risk function could overestimate or underestimate the number of awakenings generated by aircraft noise. It is true that the subjects from whom the function was generated were more annoyed by aircraft noise than the general population, but not all individuals of the general population are exposed to aircraft noise. The subjects studied by Basner et al. are more likely to be representative of the population regularly exposed to aircraft noise. Furthermore, it is worth noting that Basner's function curve was used in other locations in Europe.[3]

The authors also claim that the noise attenuations used are not experimentally supported. As mentioned in our paper, the values we used are taken directly from the WHO[4] recommendations based on the best available scientific evidence. We also mentioned that the noise attenuation offered by a closed window in a cold climate should reduce noise by 30 dB; and that the 15 dB attenuation scenario is not a realistic yearly average noise attenuation for Montreal. Yet, as detailed in the article, this scenario was used because it is representative of summertime noise levels and facilitates the comparison of our impact assessment with results obtained for the Leipzig/Halle airport.

In conclusion, Boivin and Savard did a thorough job of restating the limitations already discussed in the original article, although they sometimes seem to confuse validity with precision. We have performed further analyses to confirm that our risk estimate is indeed valid. These analyses (data not shown), which identified problematic zones using the French[5] and the WHO[4] criteria, come to conclusions similar to those reached with the use of Basner et al.'s and Transport Canada NEF 30 criteria.[6]

Louis-François Tétreault, MSc,[1] Céline Plante, MSc,[2]
Stéphane Perron, MD,[2,3] Sophie Goudreau, MSc,[2]
Norman King, MSc,[2] Audrey Smargiassi, PhD[1,4]

1. Département de santé environnementale et santé au travail, Université de Montréal, Montréal, QC
2. Direction de santé publique de l'Agence de la santé et des services sociaux de Montréal, Montréal, QC
3. Département de médecine sociale et préventive, Université de Montréal, Montréal, QC
4. Institut national de santé publique du Québec, Montréal, QC

REFERENCES

1. European Civil Aviation Conference (ECAC). Report Doc 29 'Report on Standard Method of Computing Noise Contours around Civil Airports', ECAC, 3rd Edition. 2005.
2. Basner M, Samel A, Isermann U. Aircraft noise effects on sleep: Application of the results of a large polysomnographic field study. *J Acoust Soc Am* 2006;119(5):2772-84.
3. Brink M, Schreckenberg D, Thomann G, Basner M. Aircraft noise indexes for effect oriented noise assessment. *Acta acustica united with Acustica* 2010;96:1012-25.
4. World Health Organization. Night Noise Guidelines for Europe. Geneva, Switzerland: WHO, 2009.
5. Airport Pollution Control Authority. Noise Disturbance Map. Paris, France: Airport Pollution Control Authority, 2012. Available at: http://www.acnusa.fr/index.php/en/noise-maps/noise-disturbance-map/438 (Accessed March 26, 2013).
6. Transport Canada (TC). TP 1247 - Aviation - Land Use in the Vicinity of Airports. Ministry of Transportation. Ottawa, ON: Government of Canada, 2005.

© Canadian Public Health Association, 2013. All rights reserved.