Maryland HB1103

Jamie Banks, President

Quiet Communities Inc.

Position: Favorable

My name is Jamie Banks. I am the Founder and President of Quiet Communities Inc. (QC), an independent non-profit organization of medical, scientific, and legal professionals dedicated to helping communities reduce health and environmental harm from noise and pollution – our Quiet American Skies program focuses on aviation noise and pollution. I am a health care scientist who worked for many years in health outcomes, economics, and policy, before turning to environment. I currently serve as Chair of the Noise and Health Committee of the American Public Health Association (APHA) and was principal author of the APHA's new policy statement, *Noise as a Public Health Hazard*. Before focusing on environmental health, I worked with consultancies and legal organizations in health outcomes, economics, and policy employing scientific, evidence-based approaches. My master's degrees are from MIT and Dartmouth Medical School, and my PhD is from the University of Kent in the UK.

This report elaborates on my oral testimony before the Maryland House on March 10, 2022 in favor of HB1103 to establish the Maryland Aviation Infrastructure Impacts Commission. If successfully passed, Maryland would lead by example in putting health and environmental quality at the core of aviation policy.

Harmful Noise

Aviation is a source of harmful noise. Of all sources of transportation noise, aviation noise is considered the worst (1).

- It is loud and intermittent and has strong low frequency components that carry loud noise long distances and through walls and windows – much like a boom box.
- It can be unrelenting in its intensity. Tens to hundreds of daily flights may affect neighborhoods day and night. Repeated noise is known to sensitize blood vessels to damage (2).
- Those affected often have no meaningful recourse, leading to frustration, stress, anger, and a sense of powerlessness, hopelessness, or despondency.

The impact of aviation noise was recognized 53 years ago by US Surgeon General William Stewart who declared "noise is indeed a public health hazard, a matter of public health concern" noting that "aside from hearing loss, it has been demonstrated that noise from aircraft and other sources causes physiological changes, including cardiovascular, glandular, and respiratory effects reflective of a generalized stress reaction" (3). Decades of research have elaborated the many adverse effects and the mechanisms by which noise causes harm at cellular and molecular levels.

Decades of research show that noise and pollution from transportation in general, and aviation in particular, are harmful to health. Especially vulnerable are airport workers, children, seniors and those with pre-existing conditions (4, 5).

- Aircraft noise disrupts activities and sleep and causes stress responses that increase high blood pressure, and the risks of heart disease, stroke, and mortality (6-8). Seniors affected by aircraft noise are more likely to have heart disease and be hospitalized (9). Low frequency noise and nighttime aviation noise are especially hazardous (10). A recent study showed that quieter skies during the pandemic improved cardiovascular health (11).
- Aircraft noise can contribute to anxiety and depression (12, 13).

- Aircraft noise negatively affects children's learning and cognitive development (14, 15). A ten-year study of students from 6000 schools near 46 major US airports by the National Academies of Science, Engineering and Medicine found that aircraft noise was responsible for lower standardized test scores. Installing sound insulation in a subset of those schools reversed the effect (16).
- Noise has been associated with the development of dementia (17).
- Noise is an environmental stressor, diminishing environmental quality, damaging fragile ecosystems, and contributing to loss of biodiversity (18).
- All of these impacts come with substantial economic costs. Cardiovascular disease and stroke cost the nation $350 billion annually in direct medical costs and work productivity losses (19). While not all of these costs can be attributed to noise, lowering environmental noise just 5-decibels generates annual savings of $4 billion in medical costs by reducing the prevalence of hypertension and coronary artery disease (20).

The FAA's common reference to noise as "an annoyance" trivializes its serious health impacts. No one affected by aviation noise refers to it as "an annoyance" but rather, uses words like "assault," and "torture." The impacts they describe are consistent with what has been reported in the scientific literature and include deteriorating mental and physical health, anxiety, depression, anger, exhaustion, fear; disrupted sleep, work, concentration, and communication.

Harmful Emissions

Aviation operations are a source of harmful emissions and put airport workers and residents of communities in and around flight paths at risk (21, 22), including children and other vulnerable populations.

- Aircraft emissions contain known carcinogens including volatile organic compounds and fine and ultrafine particulate matter. Fine particulate matter also causes diseases ranging from lung and heart disease to cancer, reproductive and developmental disorders, and premature death (23, 24). It has also been linked to a higher risk of dementia (25).
- Air pollution from aircraft and airport operations affects not only outdoor air quality but indoor air quality inside people's homes (26).
- Aviation emissions are associated with higher rates of cancer, lung, and heart disease and increased hospital admissions for adults and children (21).
- Like noise, air pollution is an environmental stressor, diminishing environmental quality, damaging fragile ecosystems, and contributing to loss of biodiversity (27).

Every airport is different. Understanding how current and future operations at BWI affect the health of its workers, local communities, and schools can help make decisions that support growth and operation while also protecting public health and environment. We look forward to the creation of the Maryland Aviation Infrastructure Impacts Commission.

References

1. Federal Aviation Administration. National Environmental Survey. February 2021. Accessed at: https://www.faa.gov/regulations_policies/policy_guidance/noise/survey/
2. Schmidt FP, Basner M, Kröger G, Weck S, Schnorbus B, et al. Effect of nighttime aircraft noise exposure on endothelial function and stress hormone release in healthy adults. Eur Heart J. 2013 Dec;34(45):3508-14a. doi: 10.1093/eurheartj/eht269. Epub 2013 Jul 2.
3. American Speech and Hearing Association. Proceedings of the Conference: Noise as a Public Health Hazard, Washington, DC, June 13-14, 1968. Ward WD, Fricke JE, eds. American Speech and Language Association.
4. Johnson NM, Hoffmann AR, Behlen JC, Lau C, Pendleton D, et al. Air pollution and children's health-a review of adverse effects associated with prenatal exposure from fine to ultrafine particulate matter. Environ Health Prev Med. 2021 Jul 12;26(1):72. doi: 10.1186/s12199-021-00995-5.
5. Stansfeld S, Clark C. Health Effects of Noise Exposure in Children. Curr Environ Health Rep. 2015 Jun;2(2):171-8. doi: 10.1007/s40572-015-0044-1.
6. Tawakol A, Ishai A, Takx RA, Figueroa AL, Ali A, Kaiser Y, et al. Relation between resting amygdalar activity and cardiovascular events: a longitudinal and cohort study. Lancet. 2017 Feb 25;389(10071):834-845. doi: 10.1016/S0140-6736(16)31714-7. Epub 2017 Jan 12. Erratum in: Lancet. 2017 Feb 25;389(10071):804. Erratum in: Lancet. 2017 Feb 25;389(10071):804.
7. Daiber A, Kröller-Schön S, Frenis K, Oelze M, Kalinovic S, et al. Environmental noise induces the release of stress hormones and inflammatory signaling molecules leading to oxidative stress and vascular dysfunction-Signatures of the internal exposome. Biofactors. 2019 Jul;45(4):495-506. doi: 10.1002/biof.1506. Epub 2019 Apr 2.
8. Hahad O, Frenis K, Kuntic M, Daiber A, Münzel T. Accelerated Aging and Age-Related Diseases (CVD and Neurological) Due to Air Pollution and Traffic Noise Exposure. Int J Mol Sci. 2021 Feb 28;22(5):2419. doi: 10.3390/ijms22052419.
9. Correia AW, Peters JL, Levy JI, Melly S, Dominici F. Residential exposure to aircraft noise and hospital admissions for cardiovascular diseases: multi-airport retrospective study. BMJ. 2013 Oct 8;347:f5561. doi: 10.1136/bmj.f5561.
10. Münzel T, Steven S, Hahad O, Daiber A. Noise and cardiovascular risk: nighttime aircraft noise acutely triggers cardiovascular death. Eur Heart J. 2021 Feb 21;42(8):844-846. doi: 10.1093/eurheartj/ehaa984.
11. Hahad O, Daiber A, Münzel T. Reduced Aircraft Noise Pollution During COVID-19 Lockdown Is Beneficial to Public Cardiovascular Health: a Perspective on the Reduction of Transportation-Associated Pollution. Hypertension. 2022 Feb;79(2):335-337. doi: 10.1161/HYPERTENSIONAHA.121.18607. Epub 2021 Dec 6.
12. Hegewald J, Schubert M, Freiberg A, Romero Starke K, Augustin F, et al. Traffic Noise and Mental Health: A Systematic Review and Meta-Analysis. Int J Environ Res Public Health. 2020 Aug 25;17(17):6175. doi: 10.3390/ijerph17176175.
13. Beutel ME, Jünger C, Klein EM, Wild P, Lackner K, et al. Noise Annoyance Is Associated with Depression and Anxiety in the General Population- The Contribution of Aircraft Noise. PLoS One. 2016 May 19;11(5):e0155357. doi: 10.1371/journal.pone.0155357.
14. Basner M, Clark C, Hansell A, Hileman JI, Janssen S, et al. Aviation Noise Impacts: State of the Science. Noise Health. 2017 Mar-Apr;19(87):41-50. doi: 10.4103/nah.NAH_104_16.
15. Bronzaft AL. Noise: combating a ubiquitous and hazardous pollutant. Noise Health. 2000;2(6):1-8.

16. National Academies of Sciences, Engineering, and Medicine. Assessing Aircraft Noise Conditions Affecting Student Learning, Volume 1: Final Report. Washington, DC: The National Academies Press; 2014. https://doi.org/10.17226/22433.
17. Weuve J, D'Souza J, Beck T, Evans DA, Kaufman JD, et al. Long-term community noise exposure in relation to dementia, cognition, and cognitive decline in older adults. Alzheimers Dement. 2021 Mar;17(3):525-533. doi: 10.1002/alz.12191. Epub 2020 Oct 20.
18. Buxton RT, McKenna MF, Mennitt D, Fristrup K, Crooks K, Angeloni L, Wittemyer G. Noise pollution is pervasive in U.S. protected areas. Science. 2017 May 5;356(6337):531-533. doi: 10.1126/science.aah4783.
19. Virani SS, Alonso A, Benjamin EJ, Bittencourt MS, Callaway CW, et al; American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. Heart Disease and Stroke Statistics-2020 Update: A Report from the American Heart Association. Circulation. 2020 Mar 3;141(9):e139-e596. doi: 10.1161/CIR.0000000000000757. Epub 2020 Jan 29.
20. Swinburn TK, Hammer MS, Neitzel RL. Valuing Quiet: An Economic Assessment of U.S. Environmental Noise as a Cardiovascular Health Hazard. Am J Prev Med. 2015 Sep;49(3):345-53. doi: 10.1016/j.amepre.2015.02.016. Epub 2015 May 26.
21. Bendtsen KM, Bengtsen E, Saber AT, Vogel U. A review of health effects associated with exposure to jet engine emissions in and around airports. Environ Health. 2021 Feb 6;20(1):10. doi: 10.1186/s12940-020-00690-y. Erratum in: Environ Health. 2021 Feb 24;20(1):20.
22. Wing SE, Larson TV, Hudda N, Boonyarattaphan S, Fruin S, et al. Preterm Birth among Infants Exposed to *in Utero* Ultrafine Particles from Aircraft Emissions. Environ Health Perspect. 2020 Apr;128(4):47002. doi: 10.1289/EHP5732. Epub 2020 Apr 2.
23. International Agency for Research on Cancer, World Health Organization. Air Pollution and Cancer. Edited by Straif K, Cohen A, Samet J. IARC Scientific Publication No. 161. 2013.
24. Rajagopalan S, Al-Kindi SG, Brook RD. Air Pollution and Cardiovascular Disease: JACC State-of-the-Art Review. J Am Coll Cardiol. 2018 Oct 23;72(17):2054-2070. doi: 10.1016/j.jacc.2018.07.099.
25. Peters R, Ee N, Peters J, Booth A, Mudway I, Anstey KJ. Air Pollution and Dementia: A Systematic Review. J Alzheimers Dis. 2019;70(s1):S145-S163. doi: 10.3233/JAD-180631.
26. Hudda N, Durant LW, Fruin SA, Durant JL. Impacts of Aviation Emissions on Near-Airport Residential Air Quality. Environ Sci Technol. 2020 Jul 21;54(14):8580-8588. doi: 10.1021/acs.est.0c01859. Epub 2020 Jul 8.
27. Lovett GM, Tear TH, Evers DC, Findlay SE, Cosby BJ, et al. Effects of air pollution on ecosystems and biological diversity in the eastern United States. Ann N Y Acad Sci. 2009 Apr;1162:99-135. doi: 10.1111/j.1749-6632.2009.04153.x.