BEFORE THE
GEORGIA PUBLIC SERVICE COMMISSION

In Re: Sandersville Railroad Company's Petition For Approval to Acquire Real Estate by Condemnation	**Docket No.: 45045**

PRE-FILED RESPONSIVE EXPERT TESTIMONY OF DR. ERICA WALKER

on behalf of the No Railroad in Our Community Coalition

August 30, 2023

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Q. PLEASE STATE YOUR NAME, OCCUPATION, AND ADDRESS.

A. My name is Dr. Erica D. Walker, and I am the RGSS Assistant Professor of Epidemiology at the Brown University School of Public Health ("Brown SPH"). I am the founder of the Community Noise Lab. My address is 121 South Main Street, 2nd floor Department of Epidemiology, Providence, RI 02903.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of the No Railroad in Our Community Coalition ("NROCC").

Q. PLEASE STATE YOUR CURRENT TITLE, EDUCATIONAL BACKGROUND, AND WORK EXPERIENCE.

A. As I mentioned, I am the RGSS Assistant Professor of Epidemiology at the Brown University School of Public Health. In this capacity, I also run Community Noise Lab. I have over 10 years of experience supporting communities with their noise issues. I hold a master's degree in environmental economics and urban planning from Tufts University and a doctorate in Environmental Health—with concentrations in environmental epidemiology, exposure science, and biostatistics—from the Harvard T.H. Chan School of Public Health. I have published extensively on community noise impacts on human health, in particular, vulnerable residents including children, older adults, and veterans. My work has been leveraged for public and state-wide testimony, community task forces, and Good Neighbor Agreements and has been published in esteemed publications including Nature and Scientific

American. My work has also been featured in publications including the New York Times, the Washington Post, the Boston Globe, and the Atlantic.

Beyond these accomplishments, I was also born and raised in the Deep South, in a community not too dissimilar from Sparta, Georgia. My community housed the poorest and darkest of our town's residents. There was always this nagging gut feeling that there was something about the layout of my community that wasn't quite right, and it was most likely making me, and those around me, sick—both mentally and physically. As a point of reference: directly in front of my home was a major freight rail line that ran along one of the busiest highway corridors in the state of Mississippi. For what seemed like 24 hours a day, trains carrying everything from livestock to automobiles rattled our existence, our nerves, our sanity, our windows, our foundations, our dinner plates, our lives. Yet, we all suffered in silence. Our lives to those in power had no meaning; therefore, our distress and our health were of little consequence. My work today is very much rooted in these lived experiences. I believe that we all deserve peace and quiet, a clean and healthy environment, and individuals, like me, who intimately and scientifically understand community noise impacts, to speak up on a community's behalf with objective data.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?

A. No, I have not previously testified before the Commission.

Q. PLEASE EXPLAIN THE HISTORY AND BACKGROUND OF THE COMMUNITY NOISE LAB.

A. I am the founder of the Community Noise Lab, a community-engaged research laboratory at the Brown SPH. From air, rail, and road traffic to live concerts and firework activity, I have over a decade's worth of experience supporting concerned residents across the United States with their community noise issues. The Community Noise Lab supports communities using real-time monitoring, conducting laboratory experiments, administering community surveys, developing, and releasing environmental health literacy tools, and holding engagement activities. One of our goals is to challenge existing (or creating new) policy by evaluating not only how sound is impacting community health, but how it is measured, regulated, and reported.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. NROCC members are concerned that noise from a freight train will negatively impact their community. The Community Noise Lab was asked to measure the sound levels in the impacted community in Sparta, Georgia, as well as in a similar community that currently experiences heavy rail traffic (Mendenhall, Mississippi). We took measurements at NROCC homes along the proposed rail line, including the NROCC member's home that is closest to the quarry (Mr. Kenneth Clayton, 2178 Shoals Road, Sparta, GA 31087) where we started working outwards away from the rock quarry. From our data, sound levels are highest at sites closest to the quarry and tend to generally decrease as you move further away from it.

Q. PLEASE DESCRIBE THE METHODOLOGY YOU USED.

A. In August of 2023, Community Noise Lab traveled to Sparta, Georgia, to measure sound levels in the impacted community, as well as in a similar community that currently experiences heavy rail traffic (Mendenhall, MS). For this exposure assessment, we deployed a "spot-measurement" strategy, measuring sound levels in a variety of locations for a brief period (5-minutes). Measurements were collected using a Class 1, sound level meter. Sound level meters were set up on tripods to ensure uniformity of measurements. Calibrations were performed at 90 dBA at a frequency of 1 kHz using an acoustic calibrator. A windscreen was used to mitigate the effects that wind may have on sound level readings. The geographic location of each sampling site was recorded. The sound level meter logged data in 1 second increments, which were averaged to 5-minutes. In general, Community Noise Lab measures specific types of sound: the typically reported A-weighted sound to capture the sound pressure levels that emphasize sound levels processed by the human auditory system; sound levels across the octave band from 31.5 to 16k Hz, which represents sounds that can be processed outside of the auditory system, captures the complete character of sound and is relevant to communities inundated with sounds stemming from industrial activity.

Q. PLEASE SUMMARIZE THE RESULTS.

A. My full report of the results is attached as Exhibit A. It is our opinion that the noise from the operation of an active rail line will be overwhelming to the residents of Sparta who live along its planned path, even if the train does not enter onto their property. It is also worth noting that there are significant contributions

from lower frequency sound levels currently in the community. The frequency 31.5 Hz was the dominant frequency. This is especially true in areas closest to the rock quarry.

Therefore, the combination of the existing low frequency noise from the rock quarry and the added noise from the train would be overwhelming for the residents of Sparta who live near the train line and the quarry.

Q. DESCRIBE THE HEALTH EFFECTS OF NOISE ON A COMMUNITY AND ITS RESIDENTS.

A. Noise, defined as unwanted sound, is a ubiquitous environmental stressor impacting the health and well-being of individuals exposed to it. There is both a direct and indirect pathway by which noise impacts human health. The direct pathway is being exposed to sounds loud enough to cause hearing loss. The indirect pathway includes mood disruption (annoyance, anxiety, and stress). Mood disruption sets off a stress or "flight-or-fight" response, activating the autonomic nervous and endocrine systems. This leads to an increase in blood pressure, heart rate variability (HRV) changes, and secretion of stress hormones.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

CERTIFICATE OF SERVICE

I hereby certify that I have served a true and correct copy of the foregoing Direct Testimony via electronic mail and United States Mail with sufficient postage thereon to the following, pursuant to Ga. Comp. R. & Regs. 515-16-16-.02 and 515-2-1-.04(4)(b), (3), addressed as follows:

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Respectfully submitted this 30th day of August, 2023.

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EXHIBIT A

Methodology. In August of 2023, Community Noise Lab traveled to Sparta Georgia to measure sound levels in the impacted community, as well as in a similar community but with heavy rail traffic (Mendenhall, MS). For this exposure assessment, we deployed a "spot-measurement" strategy, measuring sound levels in a variety of locations for a brief period (5-minutes). Measurements were collected using a Class 1, sound level meter. Sound level meters were set up on tripods to ensure uniformity of measurements. Calibrations were performed at 90 dBA at a frequency of 1 kHz using an acoustic calibrator. A windscreen was used to mitigate the effects that wind may have on sound level readings. The geographic location of each sampling site was recorded. The sound level meter logged data in 1 s increments, which were averaged to 5-minutes. In general, Community Noise Lab measures types of sound: the typically reported A-weighted sound to capture the sound pressure levels that emphasize sound levels processed by the human auditory system; sound levels across the octave band from 31.5 to 16k Hz, which represents sounds that can be processed outside of the auditory system, captures the complete character of sound, and is relevant to communities inundated with sounds stemming from industrial activity.

Results

Table 1: Results from Community Noise Lab's Sound Measurement Campaign on August 7, 2023.

Site	A-weighted Sound (LAEQ) dBA	Max (dBA)	Site Description/Notes	Address
1	86.3	108.4	Early in the morning Quarry noise	929 Shoals Rd, Sparta, GA
2	80.5	105.3	Closest to Quarry	2178 Shoals Road, Sparta, GA
3	44.5	63.6	Quarry noise	229 Maggie Reynolds Road, Sparta,
4	46.1	60.7	Quarry noise	291 Maggie Reynolds Rd, Sparta, GA 31087
5	55.5	69.2	Aircraft Quarry noise	291 Maggie Reynolds Rd, Sparta, GA 31087
6	45.3	65.5	Quarry noise	229 Maggie Reynolds Road, Sparta,
7	47.6	71.5	Lawn garden machinery Quarry noise	182 Clayton Blvd., Sparta, GA 3108
8	55.8	74.2	Quarry noise	124 Clayton Blvd., Sparta, GA 31087
Mendenhall, Mississippi	90.2	95.0	Location next to a freight rail line with train going by	
Mendenhall, Mississippi	91.7	101.6	Location next to a freight rail line with train going by with horn	

Discussion. We took measurements at locations along the proposed rail line, starting at Site 1 and working outwards, away from the rock quarry. From our data, sound levels are highest at sites closest to the quarry and tend to generally decrease as you move further away from it.

Given that we recorded only spot measurements, we cannot compare our findings to recommendations from both the World Health Organization and the United States Environmental Protection Agency (EPA) as their recommendations are based on a 24-hour average (either LAEQ-24 or LDN), which is the average equivalent sound level over a 24-hour period, with a penalty added for sound during the nighttime hours of 22:00 to 07:00). However, it is worth mentioning these recommendations as they are important for understanding how the levels experienced in this community may impact their health and wellbeing. From the EPA, sound level requisites to protect the public's health and welfare, for outdoor noise in residential areas and farms sound levels should be less than or equal to 55 decibels. According to the World Health Organization, sound levels should be 53 decibels during the day and 45 decibels at night.

Comparing all sites to Mendenhall sites, for communities living near railway tracks, when trains pass by, sound levels are more than 90 decibels. For those communities in Sparta that do not live currently live near an operating rail line, with the addition of a rail line, community decibel levels at any point in time can appreciate by about 40 decibels. In context, the human ear's response to sound levels is roughly logarithmic. In context, an increase of 3 dBA more than doubles the sound's intensity (Stevens, 1955). Subjectively, a 10 dBA change roughly doubles perceived loudness (Stevens, 1955). Further, the number of individuals highly annoyed by residential noise exposure doubles with every 5.5 dBA increase (ANSI, 2003). Therefore, it is our opinion that residents who now will be faced with an active rail line will find this increased sound level overwhelming, especially those who live closest to the proposed rail line.

It is also worthing noting that there are significant contributions from lower frequency sound levels. The frequency 31.5 Hz was the dominant frequency. This is especially true in areas closest to the rock quarry. While not traditionally measured, low frequency sound is particularly concerning as it can travel long distances, penetrate through solid structures, and is hard to abate. Both industrial and transportation operations like transporting goods using heavy trucks, blasting, and train engine rumbles are all major sources of low frequency sound.

Noise and Health. Noise, defined as unwanted sound, is a ubiquitous environmental stressor impacting the health and well-being of individuals exposed to it. There is both a direct and indirect pathway by which noise impacts human health. The direct pathway is being exposed to sounds loud enough to cause hearing loss. The indirect pathway includes mood disruption (annoyance, anxiety, and stress). Mood disruption sets off a stress or "flight-or-fight" response, activating the autonomic nervous and endocrine systems. This leads to an increase in blood pressure, heart rate variability (HRV) changes, and secretion of stress hormones. Chronically, the continued stress stimulation increases the risk of poor health outcomes. Previous epidemiological studies show that sound levels are associated with a wide range of stress and cardiovascular related responses including hypertension, myocardial infarction, cardiovascular disease risk, cardiovascular related hospital admissions, and mortality. Given our preliminary findings, the below tables summarize the health risks that Sparta residents face currently (given their proximity to quarry activities) and in the future (given the implementation of a freight rail line). These tables were published in a community noise lab publication from 2021 (Walker, 2021).

Table 2: *Health impacts of sound levels—Brief review of literature from 1996 to 2020*

	Health Effect	**Decibel Level dB(A)**	**Study**
Anxiety and Mood Disruption	Anxiety	Increased risk per 5dB increase over 51 dB	Stansfeld et al., (1996)
	Disturbance related physiological reactions	33 dB	Basner et al., (2014), Selander et al., (2009)
Sleep disruption	Sleep disturbances	Increased risk per 5 dB increase over 45 dB	Evandt et al., (2017)
	Sleep medication use	Increased risk per 5 dB increase over 45 dB	Evandt et al., (2017)
Cardiovascular Disorders	Prevalent hypertension	56.7 (nighttime levels); Increased risk per 5 dB; >64 dBA	Foraster et al., (2014); Bluhm et al., (2007); Bodin et al., (2009)
	Elevated blood pressure	>35 dB (nighttime levels); Increased risk per 10 dB increase; Increased risk per 5 dBA	Haralabidis et al., (2008); Dravata et al., (2012); Chang et al., (2009)
	Heart failure	Increased risk over 65 dB	Beelen et al., (2009); Seidler et al., (2016)

	Cardiovascular related hospital admissions	Increased risk over 63 dB; Increased risk per 10 dB increase	Hansell et al., (2013); Correia et al., (2013)
	Major adverse cardiac events	Increased risk per 5 dBA increase	Osborne et al., (2020)
	Myocardial infarction	Increased risk over 70 dBA; Increased risk over 50 dBA	Babisch, (2005), Selander et al., (2009)
	Strokes among the elderly	Increased risk per 10 dB over 60 dB	Sørensen et al., (2011)
Non Cardiovascular Disorders	Diabetes	Increased risk per 10 dB for 5-year exposure over 20 dB	Sørensen et al., (2012)
	Recall memory in children	>55 dB	Hygge et al., (2003)
	Hearing Impairment	8 hours at 85 dB or 15 minutes at 100 dB	Daniel, (2007)

General Mortality	Mortality	Increased risk over 63 dB; Increased risk over 60 dB; Increased risk per 10 dB	Hansell et al., (2013); Halonen et al., (2015); Héritier et al., (2017)

Table 3: *Health impacts of a sound's frequency composition—Brief review of literature from 1996 to 2018*

Health Effect	Frequency Level	Study
Thickening of pericardium , Modulating the Immune System	< 20 Hz (infrasound)	Castro et al., (1999); Branco & Alves-Pereira, (2004)
Cardiovascular Problems	40 – 60 Hz (low frequency)	Kumar et al., (2008)
Decreased HRV, Increased Cortisol Production	31 – 125 Hz (low frequency)	Waye et al., (2003), Walker et al., (2016)
Hypertension	Highest risk at 125 Hz;	Chang et al., (2014)
Difficulty concentrating, Annoyance	13 kHz-20 kHz (Very high frequency to Ultrasound	Fletcher et al., (2018)

Next Steps. Our analysis for this testimony only consisted of short-term spot measurements and may not be representative of long-term exposure. Our next step is to place several monitors in the community to measure sound for a one-week period. Further, we are also concerned about air quality in this community as well and will supplement our sound measurements with air quality levels as well.

References

Allentuck D, Draper K. Baseball saw a million more empty seats. Does it matter? New York Times. September 29 2019. Available from: https://www.nytimes.com/2019/09/29/sports/baseball/mlb-attendance.html.

Alves-Pereira, M., & Castelo Branco, N. (2007). Vibroacoustic disease: biological effects of infrasound and low-frequency noise explained by mechanotransduction cellular signaling. Progress in Biophysics and Molecular Biology, 93(1-3), 256–79

American National Standard Institute (ANSI). (2003). ANSI Standard S12.9. Quantities and procedures for description and measurement of environmental sound – Part 4: Noise assessment and prediction of long term community response, London, UK:IHS Markit.

Asmah Shad Saleem Faruqi, Shuraifa. (2018). The urban soundscape: Analysing the spatiotemporal distribution of acoustic events and its influence on the racial/ethnic composition of New York city neighbourhoods. Malaysian Journal of Music, 7, 180-194.

Babisch W, Beule B, Schust M, Kersten N, Ising H. (2005). Traffic noise and risk of myocardial infarction. Epidemiology. 16(1):33–40. [PubMed: 15613943]

Basner M, Babisch W, Davis A, et al. (2014). Auditory and non-auditory effects of noise on health. The Lancet, 383(9925), 1325-1332. doi: 10.1016/S0140-6736(13)61613-X.

Beelen, R., Hoek, G., Houthuijs, D., Brandt, P. A., Goldbohm, R. A., Fischer, P., . . . Brunekreef, B. (2008). The joint association of air pollution and noise from road traffic with cardiovascular mortality in a cohort study. Occupational and Environmental Medicine, 66(4), 243-250. doi:10.1136/oem.2008.042358

Berglund, B., Hassmen, P., Job R.F. (1996). Sources and effects of low-frequency noise. J Acoust Soc Am., 99(5), 2985-3002. http://dx.doi.org/10.1121/1.414863

Bluhm GL, Berglind N, Nordling E, Rosenlund M. (2007). Road traffic noise and hypertension. Occupational and Environmental Medicine. 64(2), 122–126. [PubMed: 17053022]

Bodin T, Albin M, Ardo J, Stroh E, Ostergren P-O, Bjork J. (2009). Road traffic noise and hypertension: results from a cross-sectional public health survey in southern Sweden. Environ Health. 8(1), 38–47. [PubMed: 19744313]

Branco, Naa Castelo, and M. Alves-Pereira. "Vibroacoustic disease." Noise and Health, vol. 6, no. 23, 2004. Gale Academic OneFile, https://link.gale.com/apps/doc/A164792497/AONE?u=mlin_b_bumml&sid=AONE&xid=4cb5f8ee. Accessed 6 Oct. 2020.

Casey, J. A., Morello-Frosch, R., Mennitt, D. J., Fristrup, K., Ogburn, E. L., & James, P. (2017). Race/ethnicity, socioeconomic status, residential segregation, and spatial variation in noise exposure in the contiguous united states. Environmental Health Perspectives, 125(7) doi:10.1289/EHP898

Castro AP, Aguas AP, Grande NR, Monteiro E, and Castelo Branco NAA. (1999)

Increase in CD8+ and CD4+ T lymphocytes in patients with vibroacoustic disease. Aviation, Space and Environmental Medicine, 70 (3, Suppl): A141-4.

Chang T, Lai Y, Hsieh H, Lai J, Liu C. (2009). Effects of environmental noise exposure on ambulatory blood pressure in young adults. Environ Res. 109(7):900-905. doi: 10.1016/j.envres.2009.05.008.

Chang, T.-Y., Beelen, R., Li S-F, Chen _T.i., Lin Y-J, Bao B-Y, Liu C-S. . (2014). Road traffic noise frequency and prevalent hypertension in Taichung, Taiwan: A cross-sectional study. Environmental Health, 13(37).

Correia AW, Peters JL, Levy JI, Melly S, Dominici F. (2013). Residential exposure to aircraft noise and hospital admissions for cardiovascular diseases: multi-airport retrospective study. BMJ. 347, f5561. [PubMed: 24103538]

Cutter S, Boruff B, Shirley L. (2003). Social vulnerability to environmental hazards. SOCIAL SCIENCE QUARTERLY, 84(2). https://onlinelibrary.wiley.com/doi/epdf/10.1111/1540-6237.8402002.

Daniel, E. (2007). Noise and Hearing Loss: A Review. Journal of School Health, 77(5), 225-231. doi:10.1111/j.1746-1561.2007.00197.x

Department of Neighborhood Development, Policy Development & Research Division. (2010). Fenway/Kenmore Data Profile. Population Demographics. Boston, MA.

Dratva J, Phuleria HC, Foraster M, Gaspoz J-M, Keidel D, Künzli N, Gerbase MW. (2012). Transportation noise and blood pressure in a population-based sample of adults. Environmental Health Perspectives: Journal of the National Institute of Environmental Health Sciences. 120, 50–55.

Evandt, J., Oftedal, B., Krog, N. H., Skurtveit, S., Nafstad, P., Schwarze, P. E., . . . Aasvang, G. M. (2017). Road traffic noise and registry based use of sleep medication. Environmental Health, 16(1). doi:10.1186/s12940-017-0330-5

Fletcher, M. D., Jones, S. L., White, P. R., Dolder, C. N., Leighton, T. G., & Lineton, B. (2018). Effects of very high-frequency sound and ultrasound on humans. Part I: Adverse symptoms after exposure to audible very-high frequency sound. The Journal of the Acoustical Society of America, 144(4), 2511-2520. doi:10.1121/1.5063819

Floud S, Vigna-Taglianti F, Hansell A, Blangiardo M, Houthuijs D, Breugelmans O, Jarup L. (2011). Medication use in relation to noise from aircraft and road traffic in six European countries: results of the HYENA study. Occupational and Environmental Medicine. 68(7), 518–24. http:// doi.org/10.1136/oem.2010.058586. [PubMed: 21084328]

Foraster, M., Künzli, N., Aguilera, I., Rivera, M., Agis, D., Vila, J., . . . Basagaña, X. (2014). High Blood Pressure and Long-Term Exposure to Indoor Noise and Air Pollution from Road Traffic. Environmental Health Perspectives, 122(11), 1193-1200. doi:10.1289/ehp.1307156

Hale, M. E. (2016). Overcoming challenges to future outdoor entertainment performances due to disruptive commercial vendor noise intensity and the resulting community outrage. The Journal of the Acoustical Society of America, 140(4), 3040-3040. doi:10.1121/1.4969439

Halonen, J., Hansell, A., Gulliver, J., Morley, D. (2015). Road traffic noise is associated with increased cardiovascular morbidity and mortality and all-cause mortality in London. European Heart Journal, 36(39). DOI: 10.1093/eurheartj/ehv216.

Hansell AL, Blangiardo M, Fortunato L, Floud S, de Hoogh K, Fecht D, Beale L. (2013). Aircraft noise and cardiovascular disease near Heathrow airport in London: small area study. BMJ. 347.

Haralabidis AS, Dimakopoulou K, Vigna-Taglianti F, Giampaolo M, Borgini A, Dudley M-L, Jarup L. (2008). Acute effects of night-time noise exposure on blood pressure in populations living near airports. European Heart Journal, 29(5), 658–64. http://doi.org/10.1093/eurheartj/ehn013. [PubMed: 18270210]

Héritier, H., Vienneau, D., Foraster, M., Eze, I. C., Schaffner, E., Thiesse, L., ... & Brink, M. (2017). Transportation noise exposure and cardiovascular mortality: a nationwide cohort study from Switzerland. European journal of epidemiology, 32(4), 307-315.

Hygge, S. (2003). Classroom experiments on the effects of different noise sources and sound levels on long-term recall and recognition in children. Applied Cognitive Psychology, 17(8), 895-914. doi:10.1002/acp.926

International Electrotechnical Commission. (2013). International Standard Electroacoustics: Sound level meters. (Standard No. 61672) Geneva: International Electrotechnical Commission.

International Organization for Standardization. (1995). Acoustics - frequency-weighting characteristic for infrasound measurements (Standard No. 7196). from https://www.iso.org/standard/13813.html

International Organization for Standardization. (2014). Acoustics — Soundscape — Part 1: Definition and conceptual framework. (Standard No. 12913), from https://www.iso.org/obp/ui

Kumar GVP, Dewangan KN, Sarkar A. Noise exposure in oil mills. Indian Journal of Occupational and Environmental Medicine. 2008; 12(1):23. [PubMed: 20040994]

Leventhall H G. (2004). Low frequency noise and annoyance. Noise Health.6:59-72

Leventhall, G. (2009). Review: Low Frequency Noise. What we know, what we do not know, and what we would like to know. Noise Notes, 8(4), 3-28. doi:10.1260/1475-4738.8.4.3

Martin, S. A. (2015). A framework to understand the relationship between social factors that reduce resilience in cities: Application to the City of Boston. International Journal of Disaster Risk Reduction, 12, 53-80. doi:10.1016/j.ijdrr.2014.12.001

Malte, V. S., Albrecht, M., Augustin, J., Bechtel, B., Dwinger, I., Gaffron, P., . . . Anke Strüver. (2018). Relation between observed and perceived traffic noise and socio-economic status in urban blocks of different characteristics. Urban Science, 2(1), 20. doi:10.3390/urbansci2010020

Murphy, E., & King, E. (2014). Environmental noise pollution: Noise mapping, public health, and policy. ProQuest Ebook Central https://ebookcentral.proquest.com

Nega, T. H., Chihara, L., Smith, K., & Jayaraman, M. (2013). Traffic noise and inequality in the twin cities, minnesota. Human and Ecological Risk Assessment: An International Journal, 19(3), 601-619. doi:10.1080/10807039.2012.691409

Ngo L, Brand R: Model selection in linear mixed effects models using sas proc mixed: Technical proceedings. SAS Users Group International. 1997, 22: 1-6.

Osborne MT, Radfar A, Hassan MZO, Abohashem S, Oberfeld B, Patrich T, Tung B, Wang Y, Ishai A, Scott JA, Shin LM, Fayad ZA, Koenen KC, Rajagopalan S, Pitman RK, Tawakol A. (2020). A neurobiological mechanism linking transportation noise to cardiovascular disease in humans. Eur Heart J. 41(6), 772-782. PMID: 31769799.

Reid, C., Mann, J., Alfasso, R., English, P., King, G., Margolis, H., . . . Balmes, J. (2011). Evaluation Of A Heat Vulnerability Index On Abnormally Hot Days: An Application Of Environmental Public Health Tracking Data. ISEE Conference Abstracts, 2011(1). doi:10.1289/isee.2011.01022

Seidler, A., Wagner, M., Schubert, M., Dröge, P., Römer, K., Pons-Kühnemann, J., . . . Hegewald, J. (2016). Aircraft, road and railway traffic noise as risk factors for heart failure and hypertensive heart disease—A case-control study based on secondary data. International Journal of Hygiene and Environmental Health, 219(8), 749-758. doi:10.1016/j.ijheh.2016.09.012

Selander, J., Nilsson, M. E., Bluhm, G., Rosenlund, M., Lindqvist, M., Nise, G., & Pershagen, G. (2009). Long-term exposure to road traffic noise and myocardial infarction. Epidemiology, 272-279.

Seltenrich N. (2017). Inequality of Noise Exposures: A Portrait of the United States. Environmental health perspectives, 125(9), 094003. https://doi.org/10.1289/EHP2471

Shehap, A. M., Shawky, H. A., & El-Basheer, T. M. (2016). Study and Assessment of Low Frequency Noise in Occupational Settings. Archives of Acoustics, 41(1), 151-160. doi:10.1515/aoa-2016-0015

Sørensen, M., Andersen, Z. J., Nordsborg, R. B., Becker, T., Tjønneland, A., Overvad, K., & Raaschou-Nielsen, O. (2013). Long-Term Exposure to Road Traffic Noise and Incident Diabetes: A Cohort Study. Environmental Health Perspectives, 121(2), 217-222. doi:10.1289/ehp.1205503

Sørensen M, Hvidberg M, Andersen ZJ, Nordsborg RB, Lillelund KG, Jakobsen J, Tjønneland A, Overvad K, Raaschou-Nielsen O. (2011). Road traffic noise and stroke: a prospective cohort study. Eur Heart J. 32(6):737-44. doi: 10.1093/eurheartj/ehq466. Epub 2011 Jan 25. PMID: 21266374.

Stansfeld, S., Gallacher, J., Babisch, W., Shipley, M. (1996). Road traffic noise and psychiatric disorder: Prospective findings from the caerphilly study. Br. Med. J., 313, pp. 266-267

Steele A. Concerts are new arenas' main attraction, rather than sports. Wall Street

Journal. Nov 19 2019. Available from: https://www.wsj.com/articles/concerts-are-new-arenas-main-attraction-rather-than-sports-11574159401.

Stevens, S. S. (1955). The Measurement of Loudness. The Journal of the Acoustical Society of America, 27(5), 815–829. doi: 10.1121/1.1908048

Tonne, C., Mila, C., Fecht, D., Alvarez, M., Gulliver, J., Smith, J., . . . Kelly, F. (2018). Socioeconomic and ethnic inequalities in exposure to air and noise pollution in london. Environment International, 115, 170-179. doi:S0160-4120(17)32125-6 [pii]

van Kamp I, Davies H. (2013). Noise and health in vulnerable groups: A review. Noise Health, 15(64),153-159. doi: 10.4103/1463-1741.112361.

Walker, E.D., Brammer, A., Cherniack, M.G., Laden F., Cavallari, J.M. (2016). Cardiovascular and stress responses to short-term noise exposures—A panel study in healthy males. Environmental Research, (150). 391-397. http://dx.doi.org/10.1016/j.envres.2016.06.016

Walker, E. D., Hart, J. E., Koutrakis, P., Cavallari, J. M., Vopham, T., Luna, M., & Laden, F. (2017). Spatial and temporal determinants of A-weighted and frequency specific sound levels—An elastic net approach. Environmental Research, 159, 491-499. doi:10.1016/j.envres.2017.08.034

Walker, Erica D., Lee, Nina F., Tieskens, Koen F., Cavallari, Jennifer M., Schollaert, Claire, Levy, Jonathan I. "Adaptive reuse and its impacts on the acoustical environment and public health of community residents: the case of Fenway, Boston, MA." Cities & Health, 2021, pp. 1-11.

Waye, K. P., Clow, A., Edwards, S., Hucklebridge, F., & Rylander, R. (2003). Effects of nighttime low frequency noise on the cortisol response to awakening and subjective sleep quality. Life Sciences, 72(8)863–875. DOI: 10.1016/S0024-3205(02)02336-6.

World Health Organization. (2018). Environmental Noise Guidelines for the European Region (p. 30).