



ÉCOSCOPE 2022

- Références de l'article de Prof. Dr Martin Rössli
- Références de l'article de Prof. Thomas Münzel, docteur en médecine (voir ci-dessous)

Références Prof. Dr Martin Rössli

Des années de vie saines perdues

Combien de maladies et de décès sont causés par le bruit issu du trafic?

Martin Rössli, Institut tropical et de santé
publique Suisse (Swiss TPH), Allschwil BL

Estimer le nombre de maladies dues au bruit avec des
évaluations des risques est possible: de tels chiffres
sont majeurs pour juger les coûts et les bénéfices
de mesures de préservation du calme.

- [1] WHO (Ed.), 2018. Environmental noise guidelines for the European Region. WHO Regional Office for Europe, Copenhagen.
- [2] Schweizerische Eidgenossenschaft, 2021. Lärmschutz-Verordnung.
https://www.fedlex.admin.ch/eli/cc/1987/338_338_338/de.
- [3] BAFU, 2020. Stand der Lärmbelastung in der Schweiz.
<https://www.bafu.admin.ch/bafu/de/home/themen/laerm/fachinformationen/laermbelastung/stand-der-laermbelastung-in-der-schweiz.html>.
- [4] Vienneau, D et al. Transportation noise exposure and cardiovascular mortality: 15-years of follow-up in a nationwide prospective cohort in Switzerland. Environ Int, 2022. 158: p. 106974.
- [5] EEA, 2020. Environmental noise in Europe — 2020, in Technical report No 22/2019. European Environment Agency, Copenhagen.
- [6] EEA, 2021. Switzerland noise fact sheet 2021.
<https://www.eea.europa.eu/themes/human/noise/noise-fact-sheets/noise-country-fact-sheets-2021/switzerland-noise-fact-sheet-2018>.
- [7] Ecoplan, 2014. Auswirkungen des Verkehrslärms auf die Gesundheit: Berechnung von DALY für die Schweiz. Bundesamt für Umwelt(BAFU). Bern. www.ecplan.ch.

- [8] Rossi, I A et al. Estimating the health benefits associated with a speed limit reduction to thirty kilometres per hour: A health impact assessment of noise and road traffic crashes for the Swiss city of Lausanne. *Environment International*, 2020. 145.
- [9] EU. Noise abatement approaches. Science for Policy 2021.
https://ec.europa.eu/environment/integration/research/newsalert/multimedia/noise_abatement_approaches_multimedia.htm.

Références Prof. Thomas Münzel, docteur en médecine

Le bruit rend malade

Le bruit – ce risque cardiovasculaire largement sous-estimé arrive rarement seul

Thomas Münzel, département
de cardiologie à l'Université
de médecine de Mayence (All)

Les maux chroniques constituent une part considérable
de la charge de morbidité globale. Le bruit issu du
trafic et la pollution de l'air concomitante sont des
déclencheurs cruciaux de ce phénomène.

- [1] Munzel T, Gori T, Babisch W, Basner M. Cardiovascular effects of environmental noise exposure. *Eur Heart J* 2014;35:829-836.
- [2] Babisch W. Cardiovascular effects of noise. *Noise Health* 2011;13:201-204.
- [3] Heritier H, Vienneau D, Foraster M, Eze IC, Schaffner E, Thiesse L, Ruzdik F, Habermacher M, Kopfli M, Pieren R, Schmidt-Trucksass A, Brink M, Cajochen C, Wunderli JM, Probst-Hensch N, Roosli M, group SNCs. Diurnal variability of transportation noise exposure and cardiovascular mortality: A nationwide cohort study from Switzerland. *Int J Hyg Environ Health* 2018;221:556-563.
- [4] Cohen AJ, Brauer M, Burnett R, Anderson HR, Frostad J, Estep K, Balakrishnan K, Brunekreef B, Dandona L, Dandona R, Feigin V, Freedman G, Hubbell B, Jobling A, Kan H, Knibbs L, Liu Y, Martin R, Morawska L, Pope CA, 3rd, Shin H, Straif K, Shaddick G, Thomas M, van Dingenen R, van Donkelaar A, Vos T, Murray CJL, Forouzanfar MH. Estimates and 25-year trends of the global burden of disease attributable to ambient air pollution: an analysis of data from the Global Burden of Diseases Study 2015. *Lancet* 2017;389:1907-1918.
- [5] Munzel T, Gori T, Al-Kindi S, Deanfield J, Lelieveld J, Daiber A, Rajagopalan S. Effects of gaseous and solid constituents of air pollution on endothelial function. *European heart journal* 2018; doi: 10.1093/eurheartj/ehy481.
- [6] Lelieveld J, Evans JS, Fnais M, Giannadaki D, Pozzer A. The contribution of outdoor air pollution sources to premature mortality on a global scale. *Nature* 2015;525:367-371.

- [7] Yue Y, Chen H, Setyan A, Elser M, Dietrich M, Li J, Zhang T, Zhang X, Zheng Y, Wang J, Yao M. Size-Resolved Endotoxin and Oxidative Potential of Ambient Particles in Beijing and Zurich. *Environ Sci Technol* 2018;52:6816-6824.
- [8] Basner M, Babisch W, Davis A, Brink M, Clark C, Janssen S, Stansfeld S. Auditory and non-auditory effects of noise on health. *Lancet* 2014;383:1325-1332.
- [9] Brook RD, Rajagopalan S, Pope CA, 3rd, Brook JR, Bhatnagar A, Diez-Roux AV, Holguin F, Hong Y, Luepker RV, Mittelman MA, Peters A, Siscovick D, Smith SC, Jr., Whitset L, Kaufman JD, American Heart Association Council on E, Prevention CotKiCD, Council on Nutrition PA, Metabolism. Particulate matter air pollution and cardiovascular disease: An update to the scientific statement from the American Heart Association. *Circulation* 2010;121:2331-2378.
- [10] Vienneau D, Schindler C, Perez L, Probst-Hensch N, Roosli M. The relationship between transportation noise exposure and ischemic heart disease: a meta-analysis. *Environ Res* 2015;138:372-380.
- [11] Babisch W. Updated exposure-response relationship between road traffic noise and coronary heart diseases: a meta-analysis. *Noise Health* 2014;16:1-9.
- [12] Roswall N, Raaschou-Nielsen O, Ketzel M, Gammelmark A, Overvad K, Olsen A, Sorensen M. Long-term residential road traffic noise and NO₂ exposure in relation to risk of incident myocardial infarction - A Danish cohort study. *Environ Res* 2017;156:80-86.
- [13] Selander J, Nilsson ME, Bluhm G, Rosenlund M, Lindqvist M, Nise G, Pershagen G. Long-term exposure to road traffic noise and myocardial infarction. *Epidemiology* 2009;20:272-279.
- [14] Sorensen M, Hvidberg M, Andersen ZJ, Nordsborg RB, Lillelund KG, Jakobsen J, Tjonneland A, Overvad K, Raaschou-Nielsen O. Road traffic noise and stroke: a prospective cohort study. *Eur Heart J* 2011;32:737-744.
- [15] Hansell AL, Blangiardo M, Fortunato L, Floud S, de Hoogh K, Fecht D, Ghosh RE, Laszlo HE, Pearson C, Beale L, Beevers S, Gulliver J, Best N, Richardson S, Elliott P. Aircraft noise and cardiovascular disease near Heathrow airport in London: small area study. *BMJ* 2013;347:f5432.
- [16] Seidler A, Wagner M, Schubert M, Droge P, Romer K, Pons-Kuhnemann J, Swart E, Zeeb H, Hegewald J. Aircraft, road and railway traffic noise as risk factors for heart failure and hypertensive heart disease-A case-control study based on secondary data. *Int J Hyg Environ Health* 2016;219:749-758.
- [17] Seidler A, Wagner M, Schubert M, Droge P, Pons-Kuhnemann J, Swart E, Zeeb H, Hegewald J. Myocardial Infarction Risk Due to Aircraft, Road, and Rail Traffic Noise. *Dtsch Arztebl Int* 2016;113:407-414.
- [18] Peters A, von Klot S, Heier M, Trentinaglia I, Hormann A, Wichmann HE, Lowel H, Cooperative Health Research in the Region of Augsburg Study G. Exposure to traffic and the onset of myocardial infarction. *N Engl J Med* 2004;351:1721-1730.
- [19] Munzel T, Sorensen M, Daiber A. Transportation noise pollution and cardiovascular disease. *Nat Rev Cardiol* 2021.
- [20] Schmidt F, Kolle K, Kreuder K, Schnorbus B, Wild P, Hechtner M, Binder H, Gori T, Munzel T. Nighttime aircraft noise impairs endothelial function and increases blood pressure in patients with or at high risk for coronary artery disease. *Clin Res Cardiol* 2015;104:23-30.

- [21] Haralabidis AS, Dimakopoulou K, Vigna-Taglianti F, Giampaolo M, Borgini A, Dudley ML, Pershagen G, Bluhm G, Houthuijs D, Babisch W, Velonakis M, Katsouyanni K, Jarup L, Consortium H. Acute effects of night-time noise exposure on blood pressure in populations living near airports. *Eur Heart J* 2008;29:658-664.
- [22] Kroller-Schon S, Daiber A, Steven S, Oelze M, Frenis K, Kalinovic S, Heimann A, Schmidt FP, Pinto A, Kvandova M, Vujacic-Mirski K, Filippou K, Dudek M, Bosmann M, Klein M, Bopp T, Hahad O, Wild PS, Frauenknecht K, Methner A, Schmidt ER, Rapp S, Mollnau H, Munzel T. Crucial role for Nox2 and sleep deprivation in aircraft noise-induced vascular and cerebral oxidative stress, inflammation, and gene regulation. *European heart journal* 2018; doi: 10.1093/eurheartj/ehy333.
- [23] Munzel T, Daiber A, Steven S, Tran LP, Ullmann E, Kossmann S, Schmidt FP, Oelze M, Xia N, Li H, Pinto A, Wild P, Pies K, Schmidt ER, Rapp S, Kroller-Schon S. Effects of noise on vascular function, oxidative stress, and inflammation: mechanistic insight from studies in mice. *Eur Heart J* 2017;38:2838-2849.
- [24] Osborne MT, Naddaf N, Abohashem S, Radfar A, Ghoneem A, Dar T, Wang Y, Patrich T, Oberfeld B, Tung B, Pitman RK, Mehta NN, Shin LM, Lo J, Rajagopalan S, Koenen KC, Grinspoon SK, Fayad ZA, Tawakol A. A neurobiological link between transportation noise exposure and metabolic disease in humans. *Psychoneuroendocrinology* 2021;131:105331.
- [25] Dar T, Osborne MT, Abohashem S, Abbasi T, Choi KW, Ghoneem A, Naddaf N, Smoller JW, Pitman RK, Denninger JW, Shin LM, Fricchione G, Tawakol A. Greater Neurobiological Resilience to Chronic Socioeconomic or Environmental Stressors Associates With Lower Risk for Cardiovascular Disease Events. *Circ Cardiovasc Imaging* 2020;13:e010337.
- [26] Brook RD, Brook JR, Urch B, Vincent R, Rajagopalan S, Silverman F. Inhalation of fine particulate air pollution and ozone causes acute arterial vasoconstriction in healthy adults. *Circulation* 2002;105:1534-1536.
- [27] Mills NL, Tornqvist H, Robinson SD, Gonzalez M, Darnley K, MacNee W, Boon NA, Donaldson K, Blomberg A, Sandstrom T, Newby DE. Diesel exhaust inhalation causes vascular dysfunction and impaired endogenous fibrinolysis. *Circulation* 2005;112:3930-3936.
- [28] Mills NL, Tornqvist H, Gonzalez MC, Vink E, Robinson SD, Soderberg S, Boon NA, Donaldson K, Sandstrom T, Blomberg A, Newby DE. Ischemic and thrombotic effects of dilute diesel-exhaust inhalation in men with coronary heart disease. *N Engl J Med* 2007;357:1075-1082.
- [29] Mills NL, Miller MR, Lucking AJ, Beveridge J, Flint L, Boere AJ, Fokkens PH, Boon NA, Sandstrom T, Blomberg A, Duffin R, Donaldson K, Hadoke PW, Cassee FR, Newby DE. Combustion-derived nanoparticulate induces the adverse vascular effects of diesel exhaust inhalation. *European heart journal* 2011;32:2660-2671.
- [30] Munzel T, Sorensen M, Gori T, Schmidt FP, Rao X, Brook J, Chen LC, Brook RD, Rajagopalan S. Environmental stressors and cardio-metabolic disease: part I-epidemiologic evidence supporting a role for noise and air pollution and effects of mitigation strategies. *Eur Heart J* 2017;38:550-556.
- [31] Munzel T, Sorensen M, Gori T, Schmidt FP, Rao X, Brook FR, Chen LC, Brook RD, Rajagopalan S. Environmental stressors and cardio-metabolic disease: part II-mechanistic insights. *Eur Heart J* 2017;38:557-564.