



The Health Consequences of Air Pollution

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Pollution and the Cardiovascular System

*The signature physiologic consequence of air pollution is the same as cigarette smoke: a low grade arterial inflammation, arteriolar narrowing, and vascular prothrombotic changes. Chemical markers of these changes are found even in young healthy adults. As with cigarette smoke the effect can be almost immediate and chronic exposure to even low concentrations of pollution are associated with an acceleration of atherosclerosis, damage to the endothelium of blood vessels, and significant arteriolar

narrowing and stiffness. Breathing more ozone in childhood increases arterial wall thickness in young adults.

***Simultaneously high concentrations of multiple pollutants have a synergistic effecton hospitalizations for cardiac disease.**

***Air pollution causes average blood pressure to increase within minutes. All organs are affected. Blood pressure rises are found in even in children and from prenatal exposure.**

***Air pollution can alter electrical signaling within the heart, starting as early as infancy. Rates of arrhythmias, heart attacks and strokes increase with air pollution and are the primary cause for increased community mortality rates. Those rates correspond to hourly pollution concentrations and stay elevated for as long as 30 days after the exposure has ended.**

***In patients who suffer from heart failure, air pollution reduces cardiac function. Even in patients without known heart disease, air pollution increases the size of heart chambers, indicative of impaired function, a precursor of heart failure.**

***Particulate pollution concentrations typical of the Wasatch Front increase mortality rates about 10% according to the formula recommended by the American Heart Association published in May, 2010. Ozone causes further increase in mortality, although less than particle matter. That means between 1,000 and 2,000 Utahns die prematurely every year due to our air pollution. Approximately 210,000 premature deaths occur annually in the US from combustion emissions.**

The average pollution related premature death represents about ten years of lost life.

***Particulate pollution from coal and diesel combustion are likely much more potent in triggering heart and vascular disease than most other sources.**

***Mortality plotted against air pollution concentrations shows no safe threshold, even at low levels, well below EPA national ambient air quality standards (NAAQS). Furthermore this curve is not linear. The steepest part of the curve is at low doses, i.e. small air pollution reductions have even greater public health benefit when the concentrations are already low. Even at what are considered ‘background’ levels of particulate pollution there are increased risks for cardiopulmonary mortality compared to clean, filtered air. Nearly all the mortality caused by air pollution occurs in cities and towns that meet the EPA’s national air quality standards.**

***Air pollution impairs exercise capability, even in the very fittest of individuals. Even in young, healthy adults air pollution increases biomarkers of inflammation and thrombosis and increases blood pressure and heart rate. Air pollution offsets the cardiorespiratory benefits of exercise.**

***Air pollution shortens life expectancy and accelerates the aging process. The residents of the average American city lose 1-3 years of life expectancy, in Northern China residents lose 5.5 years.**

***The increase in mortality risk persists for decades after exposure.**

***There are very likely genetic differences in human susceptibility to the arterial inflammation provoked by air pollution. Furthermore, the progression of inflammation and cardiovascular changes are more pronounced in those who are already at higher risk.**

***Inhaled nanoparticles preferentially lodge in the lining of blood vessels where inflammation and atherosclerosis already exist, and they can remain there for months, and perhaps much longer. Particle pollution also lodges in heart tissue, in astonishing amounts--billions of particles per gram of heart tissue.**

***Air pollution alters the blood lipid profile, decreasing HDL levels.**

***Black Americans suffer greater cardiovascular impacts from air pollution than caucasians.**

***Radioactive isotopes attached to particulate pollution carry additional cardiovascular risks.**

***Preconception air pollution exposure impairs the normal development of the heart in animals.**

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1. Brook R, Rajagopalan S, Pope CA, Brook J, Bhatnagar A, et al. AHA Scientific Statement: Particulate Matter Air Pollution and Cardiovascular Disease; An Update to the Scientific Statement From the American Heart Association. Circulation. 2010;121:2331-2378.

2. Peters, A, and Pope, CA III Editorial, Lancet. Vol 360, Oct 19, 2002
3. Pope CA III, Muhlestein JB, May HT et al. Ischemic Heart Disease Events Triggered by Short-term Exposure to Fine Particulate Air Pollution. Circulation 2006, 114:2443-2448.
4. Dockery DW, Stone PH. Cardiovascular Risks from Fine Particulate Air Pollution. NEJM 2007; 356:511-513
5. Miller KA, Siscovick DS, Sheppard L et al. Long-term Exposure to Air Pollution and Incidence of Cardiovascular Events in Women. NEJM 2007; 356:447-458.
6. Peters, A. Air Quality and Cardiovascular Health: Smoke and Pollution Matter. Circulation. 2009: 120:924-927
8. Peters A, von Klot S, Heier M, et al. Exposure to Traffic and the Onset of Myocardial Infarction. NEJM Vol. 351:1721-1730.
9. Shang-Shyue Tsai, William B. Goggins, Hui-Fen Chiu, and Chun-Yuh Yang. Evidence for an Association Between Air Pollution and Daily Stroke Admissions in Kaohsiung, Taiwan. Stroke 2003;34:2612-2616
10. Eugenia E. Calle and Michael J. Thun C. Arden Pope, III, Richard T. Burnett, Daniel Krewski, Michael Jerrett, Yuanli Shi. Circulation. 2009;120:941-948. Cardiovascular Mortality and Exposure to Airbourne Fine Particulate Matter and Cigarette Smoke.
11. Hoffman B. Presentation, American Thoracic Society (2010, May 17) Higher blood pressure found in people living in urban areas.

12. Kunzil N, Jerrett M, Garcia-Estebar, R, et al. Ambient Air Pollution and the Progression of Atherosclerosis in Adults. PloS ONE, 2010; 2010; 5 (2): e9096 DOI: 10.1371/journal.pone.0009096
13. Pope, CA III, Ezzate, M., Dockery, D. Fine-Particulate Air Pollution and Life Expectancy in the United States. NEJM. Vol. 360:376-386 Jan. 22, 2009 Num. 4.
14. Baccarelli A, Martinelli A, Zanobetti A, et al. Exposure to particulate air pollution and risk of deep vein thrombosis. Arch Intern Med. 2008; 168:920-927
15. Jacobs L, Emmerechts J, Mathieu C, Hoylaerts MF, Fierens F, Hoet PH, Nemery B, Nawrot TS. Air pollution related prothrombotic changes in persons with diabetes. Environ Health Perspect. 2010 Feb;118(2):191-6.
16. Adar SD, Klein R, Klein BE, Szpiro AA, Cutch MF, Wong TY, O'Neill MS, Shrager S, Barr RG, Siscovick DS, Daviglus ML, Sampson PD, Kaufman JD. Air Pollution and the Microvasculature: A Cross-Sectional Assessment of In Vivo Retinal Images in the Population-Based Multi-Ethnic Study of Atherosclerosis (MESA). PLoS Med. 2010 Nov 30;7(11):e1000372
17. Koehoorn M, Davies Gan WQHW, Demers PA, Tamburic L, Brauer M. Long-Term Exposure to Traffic-Related Air Pollution and the Risk of Coronary Heart Disease Hospitalization and Mortality. Environ Health Perspect. 2010 Nov 16. [Epub ahead of print]
18. Bauer M, Moebus S, Möhlenkamp S, Dragano N, Nonnemacher M, Fuchsluger M, Kessler C, Jakobs H, Memmesheimer M, Erbel R, Jöckel KH, Hoffmann B; HNR Study

Investigative Group. Urban Particulate Matter Air Pollution Is Associated With Subclinical Atherosclerosis Results From the HNR (Heinz Nixdorf Recall) Study. *J Am Coll Cardiol.* 2010 Nov 23;56(22):1803-1808.

19. Silverman RA, Ito K, Freese J, Kaufman BJ, De Claro D, Braun J, Prezant DJ. Association of Ambient Fine Particles With Out-of-Hospital Cardiac Arrests in New York City. *Am J Epidemiol.* 2010 Aug 20. [Epub ahead of print]

20. American College of Cardiology (2008, August 14). Air Pollution Damages More Than Lungs: Heart And Blood Vessels Suffer Too.

21. Kallio K, et al. Arterial Intima-Media Thickness, Endothelial Function, and Apolipoproteins in Adolescents Frequently Exposed to Tobacco Smoke. *Circulation: Cardiovascular Quality and Outcomes.* 2010. Published online before print March 2, 2010, doi: 10.1161/CIRCOUTCOMES.109.857771

22. Federation of American Societies for Experimental Biology (2010, April 28). Mexico City air pollution adversely affects the hearts of young people. *ScienceDaily.* Retrieved April 29, 2010, from <http://www.sciencedaily.com/releases/2010/04/100428153256.htm>

American Heart Association (2010, July 22). Smog might trigger cell death in the heart, study finds. *ScienceDaily.* Retrieved June 25,

23. Delfino RJ, Tjoa T, Gillen DL, Staimer N, Polidori A, Arhami M, Jamner L, Sioutas C, Longhurst J. Traffic-related air pollution and blood pressure in elderly subjects with coronary artery disease. *Epidemiology.* 2010 May;21(3):396-404.

24. Urch B, Silverman F, Corey P, Brook J, Lukic K, Rajagopalan S, Brook R. Acute Blood Pressure Responses in Healthy Adults During Controlled Air Pollution Exposures. *Environ Health Perspect.* 2005 August; 113(8): 1052–1055.
25. Ruckerl, R. et al. (2007) Air pollution and inflammation (interleukin-6, C-reactive protein, fibrinogen) in myocardial infarction survivors. *Environ. Health Perspect.* 115, 1072–1080.
26. Pham, H, AC Bonham, KE Pinkerton and CY Chen. 2009. Central neuroplasticity and decreased heart rate variability following particulate matter exposure in mice. *Environmental Health Perspectives* doi: 10.1289/ehp.0900674.
27. Alexeeff SE, Coull BA, Gryparis A, Suh H, Sparrow D, Vokonas PS, Schwartz J. Medium-Term Exposure to Traffic-Related Air Pollution and Markers of Inflammation and Endothelial Function. *Environ Health Perspect.* 2011 Feb 24. [Epub ahead of print]
28. Nawrot TS, et al. Heart attacks: Public health importance of triggers of myocardial infarction: a comparative risk assessment. *The Lancet*, Vol. 377, February 26, 2011, p. 732. DOI: 10.1016/S0140-6736(10)62296-9
29. Davoodi G, Sharif AY, Kazemisaeid A, Sadeghian S, Farahani AV, Sheikhvatan M, Pashang M. Comparison of heart rate variability and cardiac arrhythmias in polluted and clean air episodes in healthy individuals. *Environ Health Prev Med.* 2010 Jul;15(4): 217-21. Epub 2010 Jan 22.
30. Bai N, Kido T, Suzuki H, Yang G, Kavanagh TJ, Kaufman JD, Rosenfeld ME, van Breemen C, Eeden SF. Changes in

atherosclerotic plaques induced by inhalation of diesel exhaust.
Atherosclerosis. 2011 Mar 2. [Epub ahead of print]

31. Kampfrath T, Maiseyeu A, Ying Z, Shah Z, Deiuliis JA, et al. Chronic Fine Particulate Matter Exposure Induces Systemic Vascular Dysfunction via NADPH Oxidase and TLR4 Pathways. Circulation Research, 2011; 108 (6): 716 DOI: 10.1161/CIRCRESAHA.110.237560
32. Harrison CM, Pompilius M, Pinkerton KE, Ballinger SW 2011. Mitochondrial Oxidative Stress Significantly Influences Atherogenic Risk and Cytokine-Induced Oxidant Production. Environ Health Perspect 119:676-681. doi:10.1289/ehp.1002857
33. Brook RD, Shin HH, Bard RL, Burnett RT, Vette A, Croghan C, et al. 2011. Exploration of the Rapid Effects of Personal Fine Particulate Matter Exposure on Arterial Hemodynamics and Vascular Function during the Same Day. Environ Health Perspect 119:688-694. doi:10.1289/ehp.1002107
34. Sérgio Chiarelli P, Amador Pereira LA, Nascimento Saldiva PH, Ferreira Filho C, Bueno Garcia ML, Ferreira Braga AL, Conceição Martins L. The association between air pollution and blood pressure in traffic controllers in Santo André, São Paulo, Brazil. Environ Res. 2011 May 11. [Epub ahead of print]
35. Chiusolo M, Cadum E, Stafoggia M, Galassi C, Berti G, Faustini A, Bisanti L, Vigotti MA, Dessì MP, Cernigliaro A, Mallone S, Pacelli B, Minerba S, Simonato L, Forastiere F. Short Term Effects of Nitrogen Dioxide on Mortality and Susceptibility Factors in Ten Italian Cities: the EpiAir Study. Environ Health Perspect. 2011 May 17. [Epub ahead of print]

36. Domínguez-Rodríguez A, Abreu-Afonso J, Rodríguez S, Juárez-Prera RA, Arroyo- Ucar E, Jiménez-Sosa A, González Y, Abreu-González P, Avanzas P. Comparative Study of Ambient Air Particles in Patients Hospitalized for Heart Failure and Acute Coronary Syndrome. *Rev Esp Cardiol.* 2011 Aug;64(8):661-6. Epub 2011 Jun 8.
37. Pope CA, et al. Short-Term Exposure to Fine Particulate Matter Air Pollution Is Preferentially Associated With the Risk of ST-Segment Elevation Acute Coronary Events. *J Am Heart Assoc.* 2015 Dec 8;4(12). pii: e002506. doi: 10.1161/JAHA.115.002506.
38. Mallone S, Stafoggia M, Faustini A, Gobbi GP, Marconi A, Forastiere F 2011. Saharan Dust and Associations between Particulate Matter and Daily Mortality in Rome, Italy. *Environ Health Perspect.* doi:10.1289/ehp.1003026
39. Nuvolone D, Balzi D, Chini M, Scala D , Giovannini F, and Barchielli A . Short- Term Association Between Ambient Air Pollution and Risk of Hospitalization for Acute Myocardial Infarction: Results of the Cardiovascular Risk and Air Pollution in Tuscany (RISCAT) Study. *American Journal of Epidemiology* Volume174, Issue1Pp. 63-71.
40. Williams R, Brook R, Bard R, Conner T, Shin H, Burnett R. Impact of personal and ambient-level exposures to nitrogen dioxide and particulate matter on cardiovascular function. *Int J Environ Health Res.* 2011 Jun 28. [Epub ahead of print]
41. 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, July 13, 2011 DOI:10.1093/eurheartj/ ehr195

42. Fattore E, Paiano V, Borgini A, Tittarelli A, Bertoldi M, Crosignani P, Fanelli R. Human health risk in relation to air quality in two municipalities in an industrialized area of Northern Italy. Environ Res. 2011 Jul 15. [Epub ahead of print]
43. Meyer G, Boissiere J, Tanguy S, Rugale C, Gayrard S, Jover B, Obert P, Reboul C. Carbon Monoxide Pollution Impairs Myocardial Perfusion Reserve: Implication of Coronary Endothelial Dysfunction. Cardiovasc Toxicol. 2011 Jul 27. [Epub ahead of print].
44. Ayotte, P, A Carrier, N Ouellet, V Boiteau, B Abdous, EAL Sidi, ML Château-Degat and E Dewailly. 2011. Relation between methylmercury exposure and plasma paraoxonase activity in Inuit adults from Nunavik. Environmental Health Perspectives <http://dx.doi.org/10.1289/ehp.1003296>.
45. Chen R, Pan G, Zhang Y, Xu Q, Zeng G, Xu X, Chen B, Kan H. Ambient carbon monoxide and daily mortality in three Chinese cities: The China Air Pollution and Health Effects Study (CAPES). Sci Total Environ. 2011 Sep 10. [Epub ahead of print]
46. Van Hee VC, Szpiro AA, Prineas R, Neyer J, Watson K, Siscovick D, Park SK, Kaufman JD. Association of Long-term Air Pollution With Ventricular Conduction and Repolarization Abnormalities. Epidemiology. 2011 Sep 13. [Epub ahead of print]
47. Breitner S, Liu L, Cyrys J, Brüske I, Franck U, Schlink U, Leitte AM, Herbarth O, Wiedensohler A, Wehner B, Hu M, Pan XC, Wichmann HE, Peters A. Sub-micrometer particulate air

pollution and cardiovascular mortality in Beijing, China. *Sci Total Environ.* 2011 Sep 20. [Epub ahead of print]

48. Bhaskaran K, Hajat S, Armstrong B, Haines A, Herrett E, Wilkinson P, Smeeth L. The effects of hourly differences in air pollution on the risk of myocardial infarction: case crossover analysis of the MINAP database. *BMJ.* 2011 Sep 20;343:d5531. doi: 10.1136/bmj.d5531.

49. Weichenthal S, Kulka R, Dubeau A, Martin C, Wang D, Dales R 2011. Traffic- Related Air Pollution and Acute Changes in Heart Rate Variability and Respiratory Function in Urban Cyclists. *Environ Health Perspect* 119:1373-1378. <http://dx.doi.org/10.1289/ehp.1003321>

50. Szyszkowicz M, Rowe BH, Brook RD. Even Low Levels of Ambient Air Pollutants Are Associated With Increased Emergency Department Visits for Hypertension. *Can J Cardiol.* 2011 Sep 23. [Epub ahead of print]

51. Perepu RS, Dostal DE, Garcia C, Kennedy RH, Sethi R. Cardiac dysfunction subsequent to chronic ozone exposure in rats. *Mol Cell Biochem.* 2011 Sep 27. [Epub ahead of print]

52. Hoffmann B, Luttmann-Gibson H, Cohen A, Zanobetti A, de Souza C, Foley C, et al. 2011. Opposing Effects of Particle Pollution, Ozone and Ambient Temperature on Arterial Blood Pressure. *Environ Health Perspect* :-.
<http://dx.doi.org/10.1289/ehp.1103647>

53. Cakmak S, Dales R, Leech J, Liu L. The influence of air pollution on cardiovascular and pulmonary function and exercise capacity: Canadian Health Measures Survey (CHMS). *Environ Res.* 2011 Oct 13. [Epub ahead of print]

54. Emmerechts J, Hoylaerts MF. The effect of air pollution on haemostasis. *Hamostaseologie*. 2011 Oct 18;32(1). [Epub ahead of print]
55. Elliott CT, Copes R. Burden of mortality due to ambient fine particulate air pollution (PM_{2.5}) in interior and Northern BC. *Can J Public Health*. 2011 Sep-Oct;102(5):390-3.
56. Hoffmann B, et al. Opposing effects of particle pollution, ozone and ambient temperature on arterial blood pressure. *Environmental Health Perspectives*. Published online October 21, 2011. doi:10.1289/ehp.1103647.
57. Andersen ZJ, Kristiansen LC, Andersen KK, Olsen TS, Hvidberg M, Jensen SS, Ketzel M, Loft S, Sørensen M, Tjønneland A, Overvad K, Raaschou-Nielsen O. Stroke and Long-Term Exposure to Outdoor Air Pollution From Nitrogen Dioxide. Published online before print November 3, 2011, doi: 10.1161/STROKEAHA.111.629246
58. Emmerechts J, Jacobs L, Van Kerckhoven S, Loyen S, Mathieu C, Fierens F, Nemery B, Nawrot TS, Hoylaerts MF. Air Pollution-Associated Procoagulant Changes: role of Circulating Microvesicles. *J Thromb Haemost*. 2011 Nov 8. doi: 10.1111/j.1538-7836.2011.04557.x. [Epub ahead of print]
59. Hampel R, Breitner S, Schneider A, Zareba W, Kraus U, Cyrys J, Geruschkat U, Belcredi P, Müller M, Wichmann HE, Peters A. Acute air pollution effects on heart rate variability are modified by SNPs involved in cardiac rhythm in individuals with diabetes or impaired glucose tolerance. *Environ Res*. 2011 Nov 7. [Epub ahead of print]

60. Fuks K, Moebus S, Hertel S, Viehmann A, Nonnemacher M, Dragano N, et al. 2011. Long-Term Urban Particulate Air Pollution, Traffic Noise, and Arterial Blood Pressure. *Environ Health Perspect* 119:1706-1711. <http://dx.doi.org/10.1289/ehp.1103564>
61. Baccarelli A, Barretta F, Dou C, Zhang X, McCracken JP, Diaz A, Bertazzi PA, Schwartz J, Wang S, Hou L. Effects of Particulate Air Pollution on Blood Pressure in a Highly Exposed Population in Beijing, China: A repeated-measure study. *Environ Health*. 2011 Dec 21;10(1):108. [Epub ahead of print]
62. Langrish JP, Li X, Wang S, Lee MM, Barnes GD, Miller MR, et al. 2012. Reducing Personal Exposure To Particulate Air Pollution Improves Cardiovascular Health In Patients With Coronary Heart Disease. *Environ Health Perspect* :- <http://dx.doi.org/10.1289/ehp.1103898>
63. Chen SY, Su TC, Lin YL, Chan CC. Short-term Effects of Air Pollution on Pulse Pressure Among Nonsmoking Adults. *Epidemiology*. 2012 Jan 16. [Epub ahead of print]
64. Hoffmann B, Luttmann-Gibson H, Cohen A, Zanobetti A, de Souza C, Foley C, et al. 2011. Opposing Effects of Particle Pollution, Ozone, and Ambient Temperature on Arterial Blood Pressure. *Environ Health Perspect* 120:241-246. <http://dx.doi.org/10.1289/ehp.1103647>
65. Wellenius G, Burger M, Coull B, Schwartz J, et al. Ambient Air Pollution and the Risk of Acute Ischemic Stroke. *Arch Intern Med*. 2012;172(3):229-234. doi:10.1001/archinternmed.2011.732
66. Mustafic H, Jabre P, Caussin C, Murad M, et al. Main Air Pollutants and Myocardial Infarction: A Systematic Review and Meta-analysis. *JAMA* 2012. vol 307, no. 7 pg 713-721.

67. Nurkiewicz TR, Porter DW, Hubbs AF, Stone S, Moseley AM, Cumpston JL, Goodwill AG, Frisbee SJ, Perrotta PL, Brock RW, Frisbee JC, Boegehold MA, Frazer DG, Chen BT, Castranova V. Pulmonary particulate matter and systemic microvascular dysfunction. *Res Rep Health Eff Inst.* 2011 Dec;(164):3-48.
68. Channell MM, Paffett ML, Devlin RB, Madden MC, Campen MJ. Circulating factors induce coronary endothelial cell activation following exposure to inhaled diesel exhaust and nitrogen dioxide in humans: Evidence from a novel translational in vitro model. *Toxicol Sci.* 2012 Feb 13. [Epub ahead of print]
69. Schwartz J, Alexeeff SE, Mordukhovich I, Gryparis A, Vokonas P, Suh H, Coull BA. Association between long-term exposure to traffic particles and blood pressure in the Veterans Administration Normative Aging Study. *Occup Environ Med.* 2012 Mar 1. [Epub ahead of print]
70. Cosselman KE, Krishnan RM, Oron AP, Jansen K, Peretz A, Sullivan JH, Larson TV, Kaufman JD. Blood Pressure Response to Controlled Diesel Exhaust Exposure in Human Subjects. *Hypertension.* 2012 Mar 19. [Epub ahead of print]
71. Feng J, Yang W. Effects of particulate air pollution on cardiovascular health: a population health risk assessment. *PLoS One.* 2012;7(3):e33385. Epub 2012 Mar 14.
72. Tonne C, Yanosky JD, Beevers S, Wilkinson P, Kelly FJ. PM Mass Concentration and PM Oxidative Potential in Relation to Carotid Intima-media Thickness. *Epidemiology.* 2012 Mar 23. [Epub ahead of print]
73. Lepeule J, Laden F, Dockery D, Schwartz J. Chronic Exposure to Fine Particles and Mortality: An Extended Follow-Up

of the Harvard Six Cities Study from 1974 to 2009. *Environ Health Perspect*. 2012 Mar 28. [Epub ahead of print]

74. Martinelli N, Girelli D, Cigolini D, Sandri M, Ricci G, Rocca G, Olivieri O. Access rate to the emergency department for venous thromboembolism in relationship with coarse and fine particulate matter air pollution. *PLoS One*. 2012;7(4):e34831. Epub 2012 Apr 11.
75. Chen R, Kan H, Chen B, Huang W, Bai Z, Song G, Pan G. Association of Particulate Air Pollution With Daily Mortality: The China Air Pollution and Health Effects Study. *Am J Epidemiol*. 2012 Apr 17. [Epub ahead of print]
76. J. Lambrechtsen, O. Gerke, K. Egstrup, N. P. Sand, B. L. Nørgaard, H. Petersen, H. Mickley, A. C. P. Diederichsen. The relation between coronary artery calcification in asymptomatic subjects and both traditional risk factors and living in the city centre: a DanRisk substudy. *Journal of Internal Medicine*, 2012; 271 (5): 444 DOI: 10.1111/j. 1365-2796.2011.02486.x
77. Beckerman BS, Jerrett M, Finkelstein M, Kanaroglou P, Brook JR, Arain MA, Sears MR, Stieb D, Balmes J, Chapman K. The association between chronic exposure to traffic-related air pollution and ischemic heart disease. *J Toxicol Environ Health A*. 2012 Apr 1;75(7):402-11.
78. Jia X, Hao Y, Guo X. Ultrafine carbon black disturbs heart rate variability in mice. *Toxicol Lett*. 2012 Apr 15. [Epub ahead of print]
79. Van Eeden S, Leipsic J, Man SF, Sin DD. The Relationship Between Lung Inflammation and Cardiovascular Disease. *Am J Respir Crit Care Med*. 2012 Apr 26. [Epub ahead of print]

80. Crouse DL, Peters PA, van Donkelaar A, Goldberg MS, Villeneuve PJ, Brion O, et al. 2012. Risk of Nonaccidental and Cardiovascular Mortality in Relation to Long-term Exposure to Low Concentrations of Fine Particulate Matter: A Canadian National-Level Cohort Study. *Environ Health Perspect* 120:708-714. <http://dx.doi.org/10.1289/ehp.1104049>
81. Kloog I, Coull BA, Zanobetti A, Koutrakis P, Schwartz JD (2012) Acute and Chronic Effects of Particles on Hospital Admissions in New-England. *PLoS ONE* 7(4): e34664. doi:10.1371/journal.pone.0034664
82. Golomb E, Matza D, Cummings CA, Schwalb H, Kodavanti UP, Schneider A, Houminer E, Korach A, Nyska A, Shapira OM. Myocardial Mitochondrial Injury Induced by Pulmonary Exposure to Particulate Matter in Rats. *Toxicol Pathol.* 2012 May 1. [Epub ahead of print]
83. Rosenbloom J, Wilker E, Mukamal K, Schwartz J, Mittleman M. Residential Proximity to Major Roadway and 10-Year All-Cause Mortality After Myocardial Infarction *Circulation*. 2012;125:2197-2203, published online before print May 7 2012, doi: 10.1161/CIRCULATIONAHA.111.085811
84. Rich D, Kipen H, Huang W, Wang G, Wang Y, Zhu P, et al. Association Between Changes in Air Pollution Levels During the Beijing Olympics and Biomarkers of Inflammation and Thrombosis in Healthy Young Adults *JAMA*. 2012;307(19): 2068-2078. doi:10.1001/jama.2012.3488
85. Pieters N, Plusquin M, Cox B, Kicinski M, Vangronsveld J, Nawrot TS. An epidemiological appraisal of the association between heart rate variability and particulate air pollution: a meta-analysis. *Heart*. 2012 May 23. [Epub ahead of print]

86. Rich DQ, Kipen HM, Huang W, Wang G, Wang Y, Zhu P, Ohman-Strickland P, Hu M, Philipp C, Diehl SR, Lu SE, Tong J, Gong J, Thomas D, Zhu T, Zhang JJ. Association between changes in air pollution levels during the Beijing Olympics and biomarkers of inflammation and thrombosis in healthy young adults. *JAMA*. 2012 May 16;307(19):2068-78.
87. Jacobs L, Buczynska A, Walgraeve C, Delcloo A, Potgieter-Vermaak S, Van Grieken R, Demeestere K, Dewulf J, Van Langenhove H, De Backer H, Nemery B, Nawrot TS. Acute changes in pulse pressure in relation to constituents of particulate air pollution in elderly persons. *Environ Res*. 2012 Jun 18. [Epub ahead of print]
88. Devlin R, Duncan K, Jardim M, Schmitt M, Rappold A, Diaz-Sanchez D. Controlled Exposure of Healthy Young Volunteers to Ozone Causes Cardiovascular Effects. *Circulation* 2012; June 25 2012, doi:10.1161/CIRCULATIONAHA.112.094359
89. Cesaroni G, Porta D, Badaloni C, Stafoggia M, Eeftens M, Meliefste K, Forastiere F. Nitrogen dioxide levels estimated from land use regression models several years apart and association with mortality in a large cohort study. *Environ Health*. 2012 Jul 18;11(1):48. [Epub ahead of print]
90. Berman JD, Fann N, Hollingsworth JW, Pinkerton KE, Rom WN, Szema AM, et al. 2012. Health Benefits from Large Scale Ozone Reduction in the United States. *Environ Health Perspect* :-.
<http://dx.doi.org/10.1289/ehp.1104851>
91. Chen R, Huang W, Wong CM, Wang Z, Quoc Thach T, Chen B, Kan H Short-term exposure to sulfur dioxide and daily mortality in 17 Chinese cities: The China air pollution and health

effects study (CAPES). Environ Res. 2012 Jul 23. [Epub ahead of print]

92. Meng X, Zhang Y, Zhao Z, Duan X, Xu X, Kan H. Temperature modifies the acute effect of particulate air pollution on mortality in eight Chinese cities. Sci Total Environ. 2012 Jul 30;435-436C:215-221. [Epub ahead of print]

93. Breton CV, Wang X, Mack WJ, Berhane K, Lopez M, Islam TS, Feng M, Lurmann F, McConnell R, Hodis HN, Künzli N, Avol E. Childhood Air Pollutant Exposure and Carotid Artery Intima-Media Thickness in Young Adults. Circulation. 2012 Aug 15. [Epub ahead of print]

94. Perez L, Tobías A, Querol X, Pey J, Alastuey A, Díaz J, Sunyer J. Saharan dust, particulate matter and cause-specific mortality: A case-crossover study in Barcelona (Spain). Environ Int. 2012 Aug 23;48C:150-155. [Epub ahead of print]

95. Wang T, Wang L, Moreno-Vinasco L, Lang GD, Siegler JH, Mathew B, Usatyuk PV, Samet JM, Geyh AS, Breysse PN, Natarajan V, Garcia JG. Particulate matter air pollution disrupts endothelial cell barrier via calpain-mediated tight junction protein degradation. Part Fibre Toxicol. 2012 Aug 29;9(1):35. [Epub ahead of print]

96. Crabbe H. Risk of respiratory and cardiovascular hospitalisation with exposure to bushfire particulates: new evidence from Darwin, Australia. Environ Geochem Health. 2012 Oct 5. [Epub ahead of print]

97. Bedada GB, Smith CJ, Tyrrell PJ, Hirst AA, Agius R. Short-term effects of ambient particulates and gaseous pollutants on the incidence of transient ischaemic attack and

minor stroke: a case- crossover study. Environ Health. 2012 Oct 15;11(1):77. [Epub ahead of print]

98. Wu S, Deng F, Huang J, Wang H, Shima M, Wang X, Qin Y, Zheng C, Wei H, Hao Y, Lv H, Lu X, Guo X. Blood Pressure Changes and Chemical Constituents of Particulate Air Pollution: Results From The Healthy Volunteer Natural Relocation (HVNR) Study. Environ Health Perspect (): .doi:10.1289/ehp.1104812

99. Wichmann J, Voyi K. Ambient air pollution exposure and respiratory, cardiovascular and cerebrovascular mortality in cape town, South Africa: 2001–2006. Int J Environ Res Public Health. 2012 Nov 5;9(11):3978-4016. doi: 10.3390/ijerph9113978.

100. Madrigano J, Kloog I, Goldberg R, Coull BA, Mittleman MA, Schwartz J. Long- term Exposure to PM_{2.5} and Incidence of Acute Myocardial Infarction. Environ Health Perspect. 2012 Nov 29. [Epub ahead of print]

101. Correia A, Pope CA, Dockery D, Wang Y, Ezzati M, Dominici F. Effect of Air Pollution Control on Life Expectancy in the United States: An Analysis of 545 U.S. Counties for the Period from 2000 to 2007 Epidemiology. 3 December 2012 doi: 10.1097/EDE.0b013e3182770237

102. Atkinson R, Carey I, Kent A, van Staa T, Anderson HR, Cook D Long-Term Exposure to Outdoor Air Pollution and Incidence of Cardiovascular Diseases. Epidemiology, 5 December 2012. doi: 10.1097/EDE.0b013e318276ccb8

103. Cesaroni G, Badaloni C, Gariazzo C, Stafoggia M, Sozzi R, Davoli M, Forastiere F. Long-Term Exposure to Urban Air Pollution and Mortality in a Cohort of More than A Million Adults in Rome. Environ Health Perspect. 2013 Jan 8. [Epub ahead of print]

104. Shields KN, Cavallari JM, Hunt MJ, Lazo M, Molina M, Molina L, Holguin F. Traffic-related air pollution exposures and changes in heart rate variability in Mexico City: A panel study. *Environ Health*. 2013 Jan 18;12(1):7. [Epub ahead of print]
105. Wichmann J, Folke F, Torp-Pedersen C, Lippert F, Ketzel M, Ellermann T, Loft S. Out-of-Hospital Cardiac Arrests and Outdoor Air Pollution Exposure in Copenhagen, Denmark. *PLoS One*. 2013;8(1):e53684. doi: 10.1371/journal.pone.0053684. Epub 2013 Jan 14.
106. Perez CM, Ledbetter AD, Hazari MS, Hayak-Coates N, Carll AP, Winsett DW, Costa DL, Farraj AK. Hypoxia Stress Test Reveals Exaggerated Cardiovascular Effects in Hypertensive Rats after Exposure to the Air Pollutant Acrolein. *Toxicol Sci*. 2013 Jan 18. [Epub ahead of print]
107. Rosenthal FS, Kuisma M, Lanki T, Hussein T, Boyd J, Halonen JI, Pekkanen J. Association of ozone and particulate air pollution with out-of-hospital cardiac arrest in Helsinki, Finland: Evidence for two different etiologies. *J Expo Sci Environ Epidemiol*. 2013 Jan 30. doi: 10.1038/jes.2012.121. [Epub ahead of print]
108. Rivera M, Basagaña X, Aguilera I, Foraster M, Agis D, de Groot E, Perez L, Mendez MA, Bouso L, Targa J, Ramos R, Sala J, Marrugat J, Elosua R, Künzli N. Association between Long-Term Exposure to Traffic-Related Air Pollution and Subclinical Atherosclerosis: The REGICOR Study. *Environ Health Perspect*. 2013 Feb; 121(2):223-30. doi: 10.1289/ehp.1205146. Epub 2012 Dec 11.

109. Ensor KB, Raun LH, Persse D. A Case-Crossover Analysis of Out-of-Hospital Cardiac Arrest and Air Pollution. *Circulation*. 2013 Feb 13. [Epub ahead of print]
110. Tonne C, Wilkinson P. Long-term exposure to air pollution is associated with survival following acute coronary syndrome. *European Heart Journal*, 2013 DOI: 10.1093/eurheartj/ehs480
111. Mannucci PM. Airborne pollution and cardiovascular disease: burden and causes of an epidemic. *European Heart Journal*, 2013 DOI: 10.1093/eurheartj/eht045
112. Krishnan RM, Sullivan JH, Carlsten C, Wilkerson HW, Beyer RP, Bammler T, Farin F, Peretz A, Kaufman JD. A randomized cross-over study of inhalation of diesel exhaust, hematological indices, and endothelial markers in humans. Part Fibre Toxicol. 2013 Mar 26;10(1):7. [Epub ahead of print]
113. Pedata P, Bergamasco N, D'Anna A, Minutolo P, Servillo L, Sannolo N, Balestrieri ML. Apoptotic and proinflammatory effect of combustion-generated organic nanoparticles in endothelial cells. *Toxicol Lett*. 2013 Mar 25. pii: S0378-4274(13)00122-7. doi: 10.1016/j.toxlet.2013.03.017. [Epub ahead of print]
114. Xu X, Sun Y, Ha S, Talbott EO, Lissaker CT. Association between Ozone Exposure and Onset of Stroke in Allegheny County, Pennsylvania, USA, 1994-2000. *Neuroepidemiology*. 2013 Mar 20;41(1):2-6. [Epub ahead of print]
115. Yin F, Lawal A, Ricks J, Fox JR, Larson T, Navab M, Fogelman AM, Rosenfeld ME, Araujo JA. Diesel Exhaust Induces Systemic Lipid Peroxidation and Development of Dysfunctional Pro-Oxidant and Proinflammatory High-Density Lipoprotein. *Arterioscler Thromb Vasc Biol*. 2013 Apr 4. [Epub ahead of print]

116. Carlsen H, Forsberg B, Meister K, Gíslason T, Oudin A. Ozone is associated with cardiopulmonary and stroke emergency hospital visits in Reykjavik, Iceland 2003--2009. *Environmental Health* 2013, 12:28 doi:10.1186/1476-069X-12-28
117. Xiang H, Mertz KJ, Arena VC, Brink LL, Xu X, Bi Y, Talbott EO. Estimation of short-term effects of air pollution on stroke hospital admissions in wuhan, china. *PLoS One*. 2013 Apr 12;8(4):e61168. doi: 10.1371/journal.pone.0061168. Print 2013.
118. Carey IM, Atkinson RW, Kent AJ, van Staa T, Cook DG, Anderson HR. Mortality Associations with Long-Term Exposure to Outdoor Air Pollution in a National English Cohort. *Am J Respir Crit Care Med*. 2013 Apr 3. [Epub ahead of print]
119. Chang CC, Kuo CC, Liou SH, Yang CY. Fine particulate air pollution and hospital admissions for myocardial infarction in a subtropical city: taipei, taiwan. *J Toxicol Environ Health A*. 2013;76(7):440-8. doi: 10.1080/15287394.2013.771559.
120. Yu IT, Qiu H, Wang X, Tian L, Tse LA. Synergy between particles and nitrogen dioxide on emergency hospital admissions for cardiac diseases in Hong Kong. *Int J Cardiol*. 2013 Apr 19. pii: S0167-5273(13)00513-5. doi: 10.1016/j.ijcard.2013.03.082. [Epub ahead of print]
121. Adar SD, Sheppard L, Vedal S, Polak JF, Sampson PD, et al. (2013) Fine Particulate Air Pollution and the Progression of Carotid Intima-Medial Thickness: A Prospective Cohort Study from the Multi-Ethnic Study of Atherosclerosis and Air Pollution. *PLoS Med* 10(4): e1001430. doi:10.1371/journal.pmed.1001430

122. Son JY, Lee JT, Park YH, Bell ML. Short-Term Effects of Air Pollution on Hospital Admissions in Korea. *Epidemiology*. 2013 May 14. [Epub ahead of print]
123. Kloog I, Ridgway B, Koutrakis P, Coull BA, Schwartz JD. Long- and Short-Term Exposure to PM_{2.5} and Mortality Using Novel Exposure Models. *Epidemiology*. 2013 May 14. [Epub ahead of print]
124. Wittkopp S, Staimer N, Tjoa T, Gillen D, Daher N, Shafer M, Schauer JJ, Sioutas C, Delfino RJ. Mitochondrial Genetic Background Modifies the Relationship between Traffic-Related Air Pollution Exposure and Systemic Biomarkers of Inflammation. *PLoS One*. 2013 May 23;8(5):e64444. doi: 10.1371/journal.pone.0064444. Print 2013.
125. Unosson J, Blomberg A, Sandström T, Muala A, Boman C, Nyström R, Westerholm R, Mills NL, Newby DE, Langrish JP, Bosson JA. Exposure to wood smoke increases arterial stiffness and decreases heart rate variability in humans. Part Fibre Toxicol. 2013 Jun 6;10(1):20. [Epub ahead of print]
126. Stafoggia M, Samoli E, Alessandrini E, Cadum E, Ostro B, Berti G, Faustini A, Jacquemin B, Linares C, Pascal M, Randi G, Ranzi A, Stivanello E, Forastiere F. Short term Associations between Fine and Coarse Particulate Matter and Hospitalizations in Southern Europe: Results from the MED-PARTICLES Project. *Environ Health Perspect*. 2013 Jun 18. [Epub ahead of print]
127. Koton S, Molshatzki N, Yuval, Myers V, Broday DM, Drory Y, Steinberg DM, Gerber Y. Cumulative exposure to particulate matter air pollution and long-term post- myocardial infarction outcomes. *Prev Med*. 2013 Jun 15. pii: S0091-7435(13)00201-6. doi: 10.1016/j.ypmed.2013.06.009. [Epub ahead of print]

128. Pope CA 3rd, Dockery DW. Air pollution and life expectancy in China and beyond. *Proc Natl Acad Sci U S A*. 2013 Jul 11
129. Shah ASV, Langrish JP, Nair H, et al. Global association of air pollution and heart failure: a systematic review and meta-analysis. *The Lancet*. Published online July 10 2013
130. Chena Y, Ebensteinb A, Greenstone M, Lie H. Evidence on the impact of sustained exposure to air pollution on life expectancy from China's Huai River policy.
www.pnas.org/cgi/doi/10.1073/pnas.1300018110
131. Louwies T, Panis L, Kicinski M, De Boever P, Nawrot TS. Retinal Microvascular Responses to Short-Term Changes in Particulate Air Pollution in Healthy Adults. *Environ Health Perspect*. 2013 Jun 18. [Epub ahead of print]
132. Brugge D, et al. Highway proximity associated with cardiovascular disease risk: the influence of individual-level confounders and exposure misclassification. *Environmental Health* 2013, 12:84 doi:10.1186/1476-069X-12-84 Published: 3 October 2013
133. Straney L, Finn J, Dennekamp M, Bremner A, Tonkin A, Jacobs I. Evaluating the impact of air pollution on the incidence of out-of-hospital cardiac arrest in the Perth Metropolitan Region: 2000-2010. *J Epidemiol Community Health*. 2013 Sep 17. doi: 10.1136/jech-2013-202955. [Epub ahead of print]
134. Bilenko N, Rossem LV, Brunekreef B, Beelen R, Eeftens M, Hoek G, Houthuijs D, de Jongste JC, Kempen EV, Koppelman GH, Meliefste K, Oldenwening M, Smit HA, Wijga AH, Gehring U. Traffic-related air pollution and noise and children's blood

pressure: results from the PIAMA birth cohort study. *Eur J Prev Cardiol.* 2013 Sep 18. [Epub ahead of print]

135. Krall JR, GB Anderson, F Dominici, ML Bel, RD Peng. Short-term exposure to particulate matter constituents and mortality in a national study of U.S. urban communities. 2013. <http://ehp.niehs.nih.gov/1206185/>. Environmental Health Perspectives; <http://dx.doi.org/10.1289/ehp.1206185>.
136. Meng X, Ma Y, Chen R, Zhou Z, Chen B, Kan H. Size-Fractionated Particle Number Concentrations and Daily Mortality in a Chinese City. *Environ Health Perspect.* 2013 Aug 13. [Epub ahead of print]
137. Neuberger M, Moshammer H, Rabczenko D. Acute and subacute effects of urban air pollution on cardiopulmonary emergencies and mortality: time series studies in austrian cities. *Int J Environ Res Public Health.* 2013 Oct 2;10(10):4728-51. doi: 10.3390/ijerph10104728.
138. Kälsch H, Hennig F, Moebus S, Möhlenkamp S, Dragano N, Jakobs H, Memmesheimer M, Erbel R, Jöckel KH, Hoffmann B. Are air pollution and traffic noise independently associated with atherosclerosis: theHeinz Nixdorf Recall Study. *Eur Heart J.* 2013 Nov 4. [Epub ahead of print]
139. Mehta AJ, Zanobetti A, Koutrakis P, Mittleman MA, Sparrow D, Vokonas P, Schwartz J. Associations Between Short-term Changes in Air Pollution and Correlates of Arterial Stiffness: The Normative Aging Study, 2007-2011. *Am J Epidemiol.* 2013 Nov 13. [Epub ahead of print]
140. Neophytou AM, Hart JE, Cavallari JM, Smith TJ, Dockery DW, Coull BA, Garshick E, Laden F. Traffic-related exposures and

biomarkers of systemic inflammation, endothelial activation and oxidative stress: a panel study in the US trucking industry. Environ Health. 2013 Dec 7;12(1):105. [Epub ahead of print]

141. Guo Y, Li S, Tian Z, Pan X, Zhang J, Williams G. The burden of air pollution on years of life lost in Beijing, China, 2004-08: retrospective regression analysis of daily deaths. BMJ. 2013 Dec 9;347:f7139. doi: 10.1136/bmj.f7139.

142. Villarreal-Calderon R, Franco-Lira M, González-Macié A, Reynoso-Robles R, Harritt L, Pérez-Guillé B, Ferreira-Azevedo L, Drecktrah D, Zhu H, Sun Q, Torres-Jardón R, Aragón-Flores M, Calderón-Garcidueñas A, Diaz P, Calderón-Garcidueñas L. Up-Regulation of mRNA Ventricular PRNP Prion Protein Gene Expression in Air Pollution Highly Exposed Young Urbanites: Endoplasmic Reticulum Stress, Glucose Regulated Protein 78, and Nanosized Particles. Int J Mol Sci. 2013 Nov 28;14(12):23471-91. doi: 10.3390/ijms141223471

143. Gardner B, Ling F, Hopke PK, Frampton MW, Utell MJ, Zareba W, Cameron SJ, Chalupa D, Kane C, Kulandhaisamy S, Topf MC, Rich DQ. Ambient fine particulate air pollution triggers ST-elevation myocardial infarction, but not non-ST elevation myocardial infarction: a case-crossover study. Part Fibre Toxicol. 2014 Jan 2;11(1):1. [Epub ahead of print]

144. Wu Z, He EY, Scott GI, Ren J. α,β-Unsaturated aldehyde pollutant acrolein suppresses cardiomyocyte contractile function: Role of TRPV1 and oxidative stress. Environ Toxicol. 2013 Dec 23. doi: 10.1002/tox.21941. [Epub ahead of print]

145. Zanobetti A, et al. Brachial Artery Responses to Ambient Pollution, Temperature, and Humidity in People with Type 2

Diabetes: A Repeated-Measures Study. Environ Health Perspect; DOI:10.1289/ehp.1206136

146. Zhao X, Sun Z, Ruan Y, Yan J, Mukherjee B, Yang F, Duan F, Sun L, Liang R, Lian H, Zhang S, Fang Q, Gu D, Brook JR, Sun Q, Brook RD, Rajagopalan S, Fan Z. Personal Black Carbon Exposure Influences Ambulatory Blood Pressure: Air Pollution and Cardiometabolic Disease (AIRCMD-China) Study. Hypertension. 2014 Jan 13. [Epub ahead of print]
147. Cesaroni G, et al. Long term exposure to ambient air pollution and incidence of acute coronary events: prospective cohort study and meta-analysis in 11 European cohorts from the ESCAPE ProjectBMJ 2014;348:f7412
148. Beelen R, Raaschou-Nielsen O, Stafoggia M, et al. Effects of long-term exposure to air pollution on natural-cause mortality: an analysis of 22 European cohorts within the multicentre ESCAPE project. The Lancet. Published online December 9 2013
149. Gall S, et al. Exposure to parental smoking in childhood or adolescence is associated with increased carotid intima-media thickness in young adults: evidence from the Cardiovascular Risk in Young Finns study and the Childhood Determinants of Adult Health Study Eur Heart J first published online March 4, 2014 doi:10.1093/eurheartj/ehu049
150. Shaposhnikov D, et al. Mortality Related to Air Pollution with the Moscow Heat Wave and Wildfire of 2010. Epidemiology. 2014 Mar 4. [Epub ahead of print]
151. Huang YL, Chen HW, Han BC, Liu CW, Chuang HC, Lin LY, Chuang KJ. Personal Exposure to Household Particulate Matter, Household Activities and Heart Rate Variability among

Housewives. PLoS One. 2014 Mar 3;9(3):e89969. doi: 10.1371/journal.pone.0089969. eCollection 2014.

152. Beelen R. Long-term Exposure to Air Pollution and Cardiovascular Mortality: An Analysis of 22 European Cohorts. *Epidemiology*. 2014 Feb 28. [Epub ahead of print]
153. Brook RD, Bard RL, Morishita M, Dvonch JT, Wang L, Yang HY, Spino C, Mukherjee B, Kaplan MJ, Yalavarthi S, Oral EA, Ajluni N, Sun Q, Brook JR, Harkema J, Rajagopalan S. Hemodynamic, Autonomic, and Vascular Effects of Exposure to Coarse Particulate Matter Air Pollution from a Rural Location. *Environ Health Perspect*. 2014 Mar 11. [Epub ahead of print]
154. Jevtić M, Dragić N, Bijelović S, Popović M. Cardiovascular diseases and air pollution in Novi Sad, Serbia. *Int J Occup Med Environ Health*. 2014 Feb 18. [Epub ahead of print]
155. Babisch W, Wolf K, Petz M, Heinrich J, Cyrys J, and Peters A. Associations between Traffic Noise, Particulate Air Pollution, Hypertension, and Isolated Systolic Hypertension in Adults: The KORA Study. *Environ Health Perspect*; DOI:10.1289/ehp.1306981
156. Devlin RB, Smith CB, Schmitt MT, Rappold AG, Hinderliter A, Graff D, Carraway MS. Controlled Exposure of Humans with Metabolic Syndrome to Concentrated Ultrafine Ambient Particulate Matter Causes Cardiovascular Effects. *Toxicol Sci*. 2014 Apr 9. [Epub ahead of print]
157. Dai L, Zanobetti A, Koutrakis P, Schwartz JD. Associations of Fine Particulate Matter Species with Mortality in the United States: A Multicity Time-Series Analysis. *Environ Health Perspect*. 2014 May 6. [Epub ahead of print]

158. Yu XB, Su JW, Li XY, Chen G. Short-term effects of particulate matter on stroke attack: meta-regression and meta-analyses. *PLoS One*. 2014 May 6;9(5):e95682. doi: 10.1371/journal.pone.0095682. eCollection 2014.
159. Hendryx M, Luo J, Chen BC. Total and cardiovascular mortality rates in relation to discharges from toxics release inventory sites in the United States. *Environ Res*. 2014 Jun 3;133C:36-41. doi: 10.1016/j.envres.2014.05.010. [Epub ahead of print]
160. Brook R, et al. Hemodynamic, Autonomic, and Vascular Effects of Exposure to Coarse Particulate Matter Air Pollution from a Rural Location. *Environ Health Perspect*; DOI:10.1289/ehp.1306595
161. Saber AT, Jacobsen NR, Jackson P, Poulsen SS, Kyjovska ZO, Halappanavar S, Yauk CL, Wallin H, Vogel U. Particle-induced pulmonary acute phase response may be the causal link between particle inhalation and cardiovascular disease. *Wiley Interdiscip Rev Nanomed Nanobiotechnol*. 2014 Jun 12. doi: 10.1002/wnan.1279. [Epub ahead of print]
162. Vora R, Zareba W, Utell MJ, Pietropaoli AP, Chalupa D, Little EL, Oakes D, Bausch J, Wiltshire J, Frampton MW. Inhalation of ultrafine carbon particles alters heart rate and heart rate variability in people with type 2 diabetes. *Part Fibre Toxicol*. 2014 Jul 16;11(1):31. [Epub ahead of print]
163. Nyhan M, McNabola A, Misstear B. Comparison of particulate matter dose and acute heart rate variability response in cyclists, pedestrians, bus and train passengers. *Sci Total Environ*. 2014 Jan 15;468-469:821-31. doi: 10.1016/j.scitotenv.2013.08.096. Epub 2013 Sep 25.

164. Multiple exposures to airborne pollutants and hospital admissions due to diseases of the circulatory system in Santiago de Chile. *Sci Total Environ.* 2014 Jan 15;468-469:746-56. doi: 10.1016/j.scitotenv.2013.08.088. Epub 2013 Sep 23.
165. Chalbot MC, Jones TA, Kavouras IG. Trends of Non-Accidental, Cardiovascular, Stroke and Lung Cancer Mortality in Arkansas Are Associated with Ambient PM_{2.5} Reductions. *Int J Environ Res Public Health.* 2014 Jul 21;11(7):7442-7455.
166. Dai L, Zanobetti A, Koutrakis P, Schwartz J. Associations of Fine Particulate Matter Species with Mortality in the United States: A Multicity Time-Series Analysis. *Environ Health Perspect;* DOI:10.1289/ehp.1307568
167. Kim SY, Sheppard L, Kaufman JD, Bergen S, Szpiro AA, Larson TV, Adar SD, Diez Roux AV, Polak JF, Vedral S. Individual-Level Concentrations of Fine Particulate Matter Chemical Components and Subclinical Atherosclerosis: A Cross-Sectional Analysis Based on 2 Advanced Exposure Prediction Models in the Multi-Ethnic Study of Atherosclerosis. *Am J Epidemiol.* 2014 Aug 26. pii: kwu186. [Epub ahead of print]
168. Rich DQ, Mittleman MA, Link MS, Schwartz J, Luttmann-Gibson H, Catalano PJ, Speizer FE, Gold DR, Dockery DW. Increased Risk of Paroxysmal Atrial Fibrillation Episodes Associated with Acute Increases in Ambient Air Pollution. *Environ Health Perspect.* 2006; 114:120-123.
169. Rao X, Zhong J, Maiseyue A, Gopalakrishnan B, Villamena FA, Chen LC, Harkema JR, Sun Q, Rajagopalan S. CD36-Dependent 7-Ketocholesterol Accumulation in Macrophages Mediates Progression of Atherosclerosis in

Response to Chronic Air Pollution Exposure. *Circ Res.* 2014 Sep 3. pii: CIRCRESAHA.114.304666. [Epub ahead of print]

170. Dong GH, Qian ZM, Trevathan E, Zeng XW, Vaughn MG, Wang J, Zhao Y, Liu YQ, Ren WH, Qin XD. Air pollution associated hypertension and increased blood pressure may be reduced by breastfeeding in Chinese children: The Seven Northeastern Cities Chinese Children's Study. *Int J Cardiol.* 2014 Aug 26. pii: S0167-5273(14)01644-1. doi: 10.1016/j.ijcard.2014.08.099. [Epub ahead of print]

171. Karottki DG, Bekö G, Clausen G, Madsen AM, Andersen ZJ, Massling A, Ketzel M, Ellermann T, Lund R, Sigsgaard T, Møller P, Loft S. Cardiovascular and lung function in relation to outdoor and indoor exposure to fine and ultrafine particulate matter in middle-aged subjects. *Environ Int.* 2014 Sep 15;73C:372-381. doi: 10.1016/j.envint.2014.08.019. [Epub ahead of print]

172. Morishita M, Bard RL, Wang L, Das R, Dvonch JT, Spino C, Mukherjee B, Sun Q, Harkema JR, Rajagopalan S, Brook RD. The characteristics of coarse particulate matter air pollution associated with alterations in blood pressure and heart rate during controlled exposures. *J Expo Sci Environ Epidemiol.* 2014 Sep 17. doi: 10.1038/jes.2014.62. [Epub ahead of print]

173. Cakmak S, Kauri L, Shutt R, Liu L, Green MS, Mulholland M, Stieb D, Dales R. The association between ambient air quality and cardiac rate and rhythm in ambulatory subjects. *Environ Int.* 2014 Sep 13;73C:365-371. doi: 10.1016/j.envint.2014.08.015. [Epub ahead of print]

174. Baumgartner J, et al. Highway proximity and black carbon from cookstoves as a risk factor for higher blood pressure in rural China. *PNAS*, August 2014 DOI: 10.1073/pnas.1317176111

175. Wauters A, Esmaeilzadeh F, Bladt S, Beukinga I, Wijns W, van de Borne P, Pradier O, Argacha JF. Pro-thrombotic effect of exercise in a polluted environment: a P-selectin- and CD63-related platelet activation effect. *Thromb Haemost*. 2014 Oct 9;113(1). [Epub ahead of print]
176. Talbott EO, Rager JR, Benson S, Ann Brink L, Bilonick RA, Wu C. A case- crossover analysis of the impact of PM_{2.5} on cardiovascular disease hospitalizations for selected CDC tracking states. *Environ Res*. 2014 Sep 29;134C:455-465. doi: 10.1016/j.envres.2014.06.018. [Epub ahead of print]
177. Evans JM, Jenkins RA, Ilgner RH, Knapp CF, Zhang Q, Patwardhan AR. Acute cardiovascular autonomic responses to inhaled particulates. *Eur J Appl Physiol*. 2014 Oct 2. [Epub ahead of print]
178. Morishita M, Bard RL, Wang L, Das R, Dvonch JT, Spino C, Mukherjee B, Sun Q, Harkema JR, Rajagopalan S, Brook RD. The characteristics of coarse particulate matter air pollution associated with alterations in blood pressure and heart rate during controlled exposures. *J Expo Sci Environ Epidemiol*. 2014 Sep 17. doi: 10.1038/jes.2014.62. [Epub ahead of print]
179. Schulz AJ, Mentz GB, Sampson NR, Dvonch JT, Reyes AG, Izumi B. Effects of Particulate Matter and Antioxidant Dietary Intake on Blood Pressure. *Am J Public Health*. 2014 Oct 16:e1-e8. [Epub ahead of print]
180. Kurhanewicz N, McIntosh-Kastrinsky R, Tong H, Walsh L, Farraj A, Hazari MS. Ozone co-exposure modifies cardiac responses to fine and ultrafine ambient particulate matter in mice: concordance of electrocardiogram and mechanical responses. *Part Fibre Toxicol*. 2014 Oct 16;11(1):54. [Epub ahead of print]

181. Pope CA, Turner MC, Burnett R, Jerrett M, Gapstur SM, Diver WR, Krewski D, Brook RD. Relationships Between Fine Particulate Air Pollution, Cardiometabolic Disorders and Cardiovascular Mortality. *Circ Res*. 2014 Oct 27. pii: CIRCRESAHA. 114.305060. [Epub ahead of print]
182. Xie W, et al. Relationship between fine particulate air pollution and ischaemic heart disease morbidity and mortality. *Heart*. 2014 Oct 23. pii: heartjnl-2014-306165. doi: 10.1136/heartjnl-2014-306165. [Epub ahead of print]
183. Hart JE, Chiuve SE, Laden F, Albert CM. Roadway proximity and risk of sudden cardiac death in women. *Circulation*. 2014 Oct 21;130(17):1474-82. doi: 10.1161/CIRCULATIONAHA.114.011489. Epub 2014 Oct 13.
184. Yorifuji T, et al. Outdoor Air Pollution and Out-of-Hospital Cardiac Arrest in Okayama, Japan. *Journal of Occupational and Environmental Medicine*, 2014; 56 (10): 1019 DOI: 10.1097/JOM.0000000000000274
185. Zhang X, Chen Y, Wei H, Qin Y, Hao Y, Zhu Y, Deng F, Guo X. Ultrafine carbon black attenuates the antihypertensive effect of captopril in spontaneously hypertensive rats. *Inhal Toxicol*. 2014 Dec;26(14):853-60. doi: 10.3109/08958378.2014.965558.
186. Xie W, et al. Relationship between fine particulate air pollution and ischaemic heart disease morbidity and mortality. *Heart*. 2014 Oct 23. pii: heartjnl-2014-306165. doi: 10.1136/heartjnl-2014-306165. [Epub ahead of print]
187. Olsen Y, Karottki DG, Jensen DM, Bekö G, Kjeldsen BU, Clausen G, Hersoug LG, Holst GJ, Wierzbicka A, Søsgaard T, Linneberg A, Møller P, Loft S. Vascular and lung function related

to ultrafine and fine particles exposure assessed by personal and indoor monitoring: a cross-sectional study. Environ Health. 2014 Dec 15;13(1):112. [Epub ahead of print]

188. Weichenthal S, Hatzopoulou M, Goldberg MS. Exposure to traffic-related air pollution during physical activity and acute changes in blood pressure, autonomic and micro-vascular function in women: a cross-over study. Part Fibre Toxicol. 2014 Dec 9;11(1):70. [Epub ahead of print]

189. Gorr MW , et al. Early life exposure to air pollution induces adult cardiac dysfunction. American Journal of Physiology - Heart and Circulatory PhysiologyPublished 1 November 2014Vol. 307no. 9, H1353-H1360DOI: 10.1152/ajpheart.00526.2014

190. Chung Y, Dominici F, Wang Y, Coull BA, Bell ML. Associations between Long- Term Exposure to Chemical Constituents of Fine Particulate Matter (PM2.5) and Mortality in Medicare Enrollees in the Eastern United States. Environ Health Perspect. 2015 Jan 6. [Epub ahead of print]

191. Environ Pollut. 2015 Feb 9;199C:192-197. doi: 10.1016/j.envpol.2015.02.002. [Epub ahead of print]. Air pollution and mortality: Effect modification by personal characteristics and specific cause of death in a case-only study.

192. Kloog I, Zanobetti A, Nordio F, Coull BA, Baccarelli AA, Schwartz J. Effects of airborne fine particles (PM2.5) on Deep Vein Thrombosis Admissions in North Eastern United States. J Thromb Haemost. 2015 Feb 12. doi: 10.1111/jth.12873. [Epub ahead of print]

193. Li R, Kou X, Geng H, Xie J, Tian J, Cai Z, Dong C. Mitochondrial damage: An important mechanism of ambient

PM2.5 exposure-induced acute heart injury in rats. *J Hazard Mater.* 2015 Feb 4;287C:392-401. doi: 10.1016/j.jhazmat.2015.02.006. [Epub ahead of print]

194. Faustini A, Alessandrini ER, Pey J, Perez N, Samoli E, Querol X, Cadum E, Perrino C, Ostro B, Ranzi A, Sunyer J, Stafoggia M, Forastiere F Short-term effects of particulate matter on mortality during forest fires in Southern Europe: results of the MED-PARTICLES Project. *Occup Environ Med.* 2015 Feb 17. pii: oemed-2014-102459. doi: 10.1136/oemed-2014-102459. [Epub ahead of print]

195. Pope CA 3rd, Turner MC, Burnett RT, Jerrett M, Gapstur SM, Diver WR, Krewski D, Brook RD. Relationships between fine particulate air pollution, cardiometabolic disorders, and cardiovascular mortality. *Circ Res.* 2015 Jan 2;116(1):108-15. doi: 10.1161/CIRCRESAHA.116.305060. Epub 2014 Oct 27.

196. Su TC, Hwang JJ, Shen YC, Chan CC. Carotid Intima-Media Thickness and Long-Term Exposure to Traffic-Related Air Pollution in Middle-Aged Residents of Taiwan: A Cross-Sectional Study. *Environ Health Perspect.* 2015 Mar 20. [Epub ahead of print]

197. Chen SY, Wu CF, Lee JH, Hoffmann B, Peters A, Brunekreef B, Chu DC, Chan CC. Associations between Long-Term Air Pollutant Exposures and Blood Pressure in Elderly Residents of Taipei City: A Cross-Sectional Study. *Environ Health Perspect.* 2015 Mar 20. [Epub ahead of print]

198. Burroughs Peña M, Romero KM, Velazquez EJ, Davila-Roman VG, Gilman RH, Wise RA, Miranda JJ, Checkley W. Relationship Between Daily Exposure to Biomass Fuel Smoke and Blood Pressure in High-Altitude Peru. *Hypertension.* 2015

Mar 9. pii: HYPERTENSIONAHA.114.04840. [Epub ahead of print]

199. Chan S, et al. Long-Term Air Pollution Exposure and Blood Pressure in the Sister Study. *Environ Health Perspect*; DOI:10.1289/ehp.1408125

200. Pieters N, et al. Blood Pressure and Same-Day Exposure to Air Pollution at School: Associations with Nano-Sized to Coarse PM in Children. *Environ Health Perspect*; DOI:10.1289/ehp.1408121

201. ChenR,ZhaoZ,SunQ,LinZ,ZhaoA,WangC,XiaY,XuX,KanH. Size- fractionated Particulate Air Pollution and Circulating Biomarkers of Inflammation, Coagulation, and Vasoconstriction in a Panel of Young Adults. *Epidemiology*. 2015 Feb 25. [Epub ahead of print]

202. Chung M, Wang DD, Rizzo AM, Gachette D, Delnord M, Parambi R, Kang CM, Brugge D. Association of PNC, BC, and PM_{2.5} Measured at a Central Monitoring Site with Blood Pressure in a Predominantly Near Highway Population. *Int J Environ Res Public Health*. 2015 Mar 3;12(3):2765-80. doi: 10.3390/ijerph120302765.

203. Ostro B, et al. Associations of Mortality with Long-Term Exposures to Fine and Ultrafine Particles, Species and Sources: Results from the California Teachers Study Cohort. *Environmental Health Perspectives*, <http://dx.doi.org/10.1289/ehp.1408565>. Advance Publication: 23 January 201

204. Fischer PH, Marra M, Ameling CB, Hoek G, Beelen R, de Hoogh K, Breugelmans O, Kruize H, Janssen NA, Houthuijs D. Air Pollution and Mortality in Seven Million Adults: The Dutch

Environmental Longitudinal Study (DUELS). Environ Health Perspect. 2015 Mar 11. [Epub ahead of print]

205. van Rossem L, et al. Prenatal Air Pollution Exposure and Newborn Blood Pressure. Environ Health Perspect; DOI:10.1289/ehp.1307419

206. Zhao A, Chen R, Wang C, Zhao Z, Yang C, Lu J, Chen X, Kan H. Associations between size-fractionated particulate air pollution and blood pressure in a panel of type II diabetes mellitus patients. Environ Int. 2015 Mar 30;80:19-25. doi: 10.1016/j.envint.2015.03.003. [Epub ahead of print]

207. Wong CM, Lai HK, Tsang H, Thach TQ, Thomas GN, Lam KB, Chan KP, Yang L, Lau AK, Ayres JG, Lee SY, Chan WM, Hedley AJ, Lam TH. Satellite-Based Estimates of Long-Term Exposure to Fine Particles and Association with Mortality in Elderly Hong Kong Residents. Environ Health Perspect. 2015 Apr 24. [Epub ahead of print]

208. Dominici F, Wang Y, Correia AW, Ezzati M, Pope CA 3rd, Dockery DW. Chemical Composition of Fine Particulate Matter and Life Expectancy: In 95 US Counties Between 2002 and 2007. Epidemiology. 2015 Apr 22. [Epub ahead of print]

209. Shi L, et al. Low-Concentration PM2.5 and Mortality: Estimating Acute and Chronic Effects in a Population-Based Study. Environ Health Perspect DOI: 10.1289/ ehp.1409111

210. Wolf K, et al. Long-term Exposure to Particulate Matter Constituents and the Incidence of Coronary Events in 11 European Cohorts. Epidemiology. 2015 May 14. [Epub ahead of print]

211. Andersen ZA, et al. A Study of the Combined Effects of Physical Activity and Air Pollution on Mortality in Elderly Urban Residents: The Danish Diet, Cancer, and Health Cohort. *Environ Health Perspect*; DOI:10.1289/ehp.1408698
212. Akintoye E, et al. Association between fine particulate matter exposure and subclinical atherosclerosis: A meta-analysis. *Eur J Prev Cardiol*. 2015 May 29. pii: 2047487315588758. [Epub ahead of print]
213. ResBart Ostro R. et al. Associations of Mortality with Long-Term Exposures to Fine and Ultrafine Particles, Species and Sources: *Environ Health Perspect*; DOI: 10.1289/ehp.1408565
214. Ta-Chen Su, et al. Carotid Intima-Media Thickness and Long-Term Exposure to Traffic-Related Air Pollution in Middle-Aged Residents of Taiwan: A Cross-Sectional Study. *Environ Health Perspect*; DOI:10.1289/ehp.1408553
215. Szu-Ying C, et al. Associations between Long-Term Air Pollutant Exposures and Blood Pressure in Elderly Residents of Taipei City: A Cross-Sectional Study. *Environ Health Perspect*; DOI:10.1289/ehp.1408771
216. Szu-Ying C, et al. Associations between Long-Term Air Pollutant Exposures and Blood Pressure in Elderly Residents of Taipei City: A Cross-Sectional Study. *Environ Health Perspect*; DOI:10.1289/ehp.1408771
217. Bangia K, Symanski E, Strom SS, Bondy M. A cross-sectional analysis of polycyclic aromatic hydrocarbons and diesel particulate matter exposures and hypertension among individuals of Mexican origin. *Environ Health*. 2015 Jun 12;14(1): 51. [Epub ahead of print]

218. Fischer P, et al. Air Pollution and Mortality in Seven Million Adults: The Dutch Environmental Longitudinal Study (DUELS) Environ Health Perspect; DOI: 10.1289/ehp.1408254
219. Schwartz J, Austin E, Bind MA, Zanobetti A, Koutrakis P. Estimating Causal Associations of Fine Particles With Daily Deaths in Boston. Am J Epidemiol. 2015 Sep 6. pii: kwv101. [Epub ahead of print]
220. Lee M, Koutrakis P, Coull B, Kloog I, Schwartz J. Acute effect of fine particulate matter on mortality in three Southeastern states from 2007-2011. J Expo Sci Environ Epidemiol. 2015 Aug 26. doi: 10.1038/jes.2015.47. [Epub ahead of print]
221. Giorgini P, Rubenfire M, Bard RL, Jackson EA, Ferri C, Brook RD. Air Pollution and Exercise: A REVIEW OF THE CARDIOVASCULAR IMPLICATIONS FOR HEALTH CARE PROFESSIONALS. J Cardiopulm Rehabil Prev. 2015 Sep 16. [Epub ahead of print]
222. Wu S, Deng F, Huang J, Wang X, Qin Y, Zheng C, Wei H, Shima M, Guo X. Does ambient temperature interact with air pollution to alter blood pressure? A repeated-measure study in healthy adults. J Hypertens. 2015 Sep 16. [Epub ahead of print]
223. Vodonos A, et al. Individual Effect Modifiers of Dust Exposure Effect on Cardiovascular Morbidity. PLoS One. 2015 Sep 18;10(9):e0137714. doi: 10.1371/journal.pone.0137714.
224. Crouse D, et al. Ambient PM_{2.5}, O₃, and NO₂ Exposures and Associations with Mortality over 16 Years of Follow-Up in the Canadian Census Health and Environment Cohort (CanCHEC). Environ Health Perspect; DOI:10.1289/ehp.1409276

225. Powell H, et al. Ambient Coarse Particulate Matter and Hospital Admissions in the Medicare Cohort Air Pollution Study, 1999-2010. *Environ Health Perspect*; DOI:10.1289/ehp.1408720
226. Lin H, et al. Particle size and chemical constituents of ambient particulate pollution associated with cardiovascular mortality in Guangzhou, China. *Environ Pollut*. 2015 Nov 8. pii: S0269-7491(15)30156-1. doi: 10.1016/j.envpol.2015.10.056. [Epub ahead of print]
227. Liu W, et al. The association of annual air pollution exposure with blood pressure among patients with sleep-disordered breathing. *Sci Total Environ*. 2015 Nov 12;543(Pt A):61-66. doi: 10.1016/j.scitotenv.2015.10.135. [Epub ahead of print]
228. Kang SH, et al. Ambient air pollution and out-of-hospital cardiac arrest. *Int J Cardiol*. 2015 Nov 18;203:1086-1092. doi: 10.1016/j.ijcard.2015.11.100. [Epub ahead of print]
229. Broome RA, et al. The mortality effect of ship-related fine particulate matter in the Sydney greater metropolitan region of NSW, Australia. *Environ Int*. 2015 Nov 28;87:85-93. doi: 10.1016/j.envint.2015.11.012. [Epub ahead of print]
230. Caiazzo F, et al. Air pollution and early deaths in the United States. Part I: Quantifying the impact of major sectors in 2005. *Atmospheric Environment*. Volume 79, November 2013, Pages 198–208
231. Thurston GD, Burnett RT, Turner MC, Shi Y, Krewski D, Lall R, Ito K, Jerrett M, Gapstur SM, Diver WR, Pope CA 3rd. Ischemic Heart Disease Mortality and Long-Term Exposure to

Source-Related Components of U.S. Fine Particle Air Pollution.
Environ Health Perspect. 2015 Dec 2. [Epub ahead of print]

232. Van Hee V, et al. Association of Long-Term Air Pollution with Ventricular Conduction and Repolarization Abnormalities. Epidemiology. 2011 Nov; 22(6): 773–780.
233. Hart JE, Puett RC, Rexrode KM, Albert CM4, Laden F. Effect Modification of Long-Term Air Pollution Exposures and the Risk of Incident Cardiovascular Disease in US Women. J Am Heart Assoc. 2015 Nov 25;4(12). pii: e002301. doi: 10.1161/JAHA.115.002301.
234. Shanley RP, Hayes RB, Cromar KR, Ito K, Gordon T, Ahn J. "Particulate Air Pollution and Clinical Cardiovascular Disease Risk Factors". Epidemiology. 2015 Nov 24. [Epub ahead of print]
235. Mordukhovich I, Kloog I, Coull B, Koutrakis P, Vokonas P, Schwartz J. Association between Particulate Air Pollution and QT Interval Duration in an Elderly Cohort. Epidemiology. 2015 Nov 24. [Epub ahead of print]
236. Mentz RJ, O'Brien EC. Air Pollution in Patients With Heart Failure: Lessons From a Mechanistic Pilot Study of a Filter Intervention. JACC Heart Fail. 2016 Jan;4(1):65-7. doi: 10.1016/j.jchf.2015.11.008.
237. Meo SA, Suraya F. Effect of environmental air pollution on cardiovascular diseases. Eur Rev Med Pharmacol Sci. 2015 Dec;19(24):4890-4897.
238. Sen T, Astarcioglu MA, Asarcikli LD, Kilit C, Kafes H, Parspur A, Yaymaci M, Pinar M, Tüfekcioglu O, Amasyali. The effects of air pollution and weather conditions on the incidence of

acute myocardial infarction. *Am J Emerg Med.* 2015 Dec 4. pii: S0735-6757(15)01054-2. doi: 10.1016/j.ajem.2015.11.068. [Epub ahead of print]

239. Turner MC, et al. Long-Term Ozone Exposure and Mortality in a Large Prospective Study. *Am J Respir Crit Care Med.* 2015 Dec 17. [Epub ahead of print]

240. Weichenthal S, Crouse DL, Pinault L, Godri-Pollitt K, Lavigne E, Evans G, van Donkelaar A, Martin RV, Burnett RT. Oxidative burden of fine particulate air pollution and risk of cause-specific mortality in the Canadian Census Health and Environment Cohort (CanCHEC). *Environ Res.* 2015 Dec 30;146:92-99. doi: 10.1016/j.envres.2015.12.013. [Epub ahead of print]

241. Hansell A, et al. Historic air pollution exposure and long-term mortality risks in England and Wales: prospective longitudinal cohort study. *Thorax* 2015;0:1–9.
doi:10.1136/thoraxjnl-2015-207111

242. Cutrufello PT, Rundell KW, Smoliga JM, Stylianides GA. Inhaled whole exhaust and its effect on exercise performance and vascular function. *Inhal Toxicol.* 2011 Sep;23(11):658-67. doi:10.3109/08958378.2011.604106. Epub 2011 Aug 25.

243. Cakmak S, Dales R, Leech J, Liu L. The influence of air pollution on cardiovascular and pulmonary function and exercise capacity: Canadian Health Measures Survey (CHMS). *Environ Res.* 2011 Nov;111(8):1309-12. doi: 10.1016/j.envres.2011.09.016. Epub 2011 Oct 13.

244. Thompson LC, et al. Acrolein Inhalation Alters Myocardial Synchrony and Performance at and Below Exposure

Concentrations that Cause Ventilatory Responses. *Cardiovasc Toxicol.* 2016 Feb 19. [Epub ahead of print]

245. Bind MA, et al. Quantile Regression Analysis of the Distributional Effects of Air Pollution on Blood Pressure, Heart Rate Variability, Blood Lipids, and Biomarkers of Inflammation in Elderly American Men: The Normative Aging Study. *Environ Health Perspect.* 2016 Mar 11. [Epub ahead of print]
246. Vaduganathan M, et al. Risk of Cardiovascular Hospitalizations from Exposure to Coarse Particulate Matter (PM10) Below the European Union Safety Threshold. *Am J Cardiol.* 2016 Feb 2. pii: S0002-9149(16)30163-1. doi: 10.1016/j.amjcard.2016.01.041. [Epub ahead of print]
247. Møller P, et al. Atherosclerosis and vasomotor dysfunction in arteries of animals after exposure to combustion-derived particulate matter or nanomaterials. *Crit Rev Toxicol.* 2016 Mar 30:1-40. [Epub ahead of print]
248. Becerra AZ, et al. Increases in Ambient Particulate Matter Air Pollution, Acute Changes in Platelet Function, and Effect Modification by Aspirin and Omega-3 Fatty Acids: A Panel Study. *J Toxicol Environ Health A.* 2016 Mar 30:1-12. [Epub ahead of print]
249. Costello S, et al. Incident Ischemic Heart Disease After Long-Term Occupational Exposure to Fine Particulate Matter: Accounting for 2 Forms of Survivor Bias. *Am J Epidemiol.* 2016 Mar 31. pii: kwv218. [Epub ahead of print]
250. Monrad M, et al. Long-Term Exposure to Traffic-Related Air Pollution and Risk of Incident Atrial Fibrillation: A Cohort Study. *Environ Health Perspect.* 2016 Jul 29. [Epub ahead of print]

251. Hartiala J, Breton CV, Tang WH, Lurmann F, Hazen SL, Gilliland FD, Allayee H. Ambient Air Pollution Is Associated With the Severity of Coronary Atherosclerosis and Incident Myocardial Infarction in Patients Undergoing Elective Cardiac Evaluation. *J Am Heart Assoc.* 2016 Jul 28;5(8). pii: e003947. doi: 10.1161/JAHA.116.003947.
252. Song X, Liu Y, Hu Y, Zhao X, Tian J, Ding G, Wang S Short-Term Exposure to Air Pollution and Cardiac Arrhythmia: A Meta-Analysis and Systematic Review. *Int J Environ Res Public Health.* 2016 Jun 28;13(7). pii: E642.
253. Aguilera I, et al. Particulate Matter and Subclinical Atherosclerosis: Associations between Different Particle Sizes and Sources with Carotid Intima-Media Thickness in the SAPALDIA Study. *Environ Health Perspect.* 2016 Jun 3. [Epub ahead of print]
254. Kaufman, J, et al. Association between air pollution and coronary artery calcification within six metropolitan areas in the USA (the Multi-Ethnic Study of Atherosclerosis and Air Pollution): a longitudinal cohort study. *Lancet.* 2016 May 24. pii: S0140-6736(16)00378-0. doi: 10.1016/S0140-6736(16)00378-0. DOI: [http://dx.doi.org/10.1016/S0140-6736\(16\)00378-0](http://dx.doi.org/10.1016/S0140-6736(16)00378-0)
255. Schwartz J. et al. Estimating Causal Effects of Local Air Pollution on Daily Deaths: Effect of Low Levels. *Environ Health Perspect;* DOI:10.1289/EHP232
256. Zhang Y, Ji X1, Ku T, Li G, Sang N. Heavy metals bound to fine particulate matter from northern China induce season-dependent health risks: A study based on myocardial toxicity. *Environ Pollut.* 2016 Jun 21;216:380-390. doi: 10.1016/j.envpol.2016.05.072. [Epub ahead of print]

257. Zhang Z, et al. Long-Term Exposure to Particulate Matter and Self-Reported Hypertension: A Prospective Analysis in the Nurses' Health Study. *Environ Health Perspect*; DOI:10.1289/EHP163
258. Argacha JF, et al. Air pollution and ST-elevation myocardial infarction: A case-crossover study of the Belgian STEMI registry 2009-2013. *Int J Cardiol*. 2016 Jul 30;223:300-305. doi: 10.1016/j.ijcard.2016.07.191. [Epub ahead of print]
259. Pope CA, Bhatnagar A, McCracken J, Abplanalp WT, Conklin DJ, O'Toole TE. Exposure to Fine Particulate Air Pollution Is Associated with Endothelial Injury and Systemic Inflammation. *Circ Res*. 2016 Oct 25. pii: CIRCRESAHA.116.309279.
260. Alessandrini ER, et al. Association Between Short-Term Exposure to PM_{2.5} and PM₁₀ and Mortality in Susceptible Subgroups: A Multisite Case-Crossover Analysis of Individual Effect Modifiers. *Am J Epidemiol*. 2016 Oct 25. [Epub ahead of print]
261. Macintyre HL, et al. Mortality and emergency hospitalizations associated with atmospheric particulate matter episodes across the UK in spring 2014. *Environ Int*. 2016 Aug 24. pii: S0160-4120(16)30284-7. doi: 10.1016/j.envint.2016.07.018. [Epub ahead of print]
262. Chen K, et al. Acute effect of ozone exposure on daily mortality in seven cities of Jiangsu Province, China: No clear evidence for threshold. *Environ Res*. 2017 Feb 20;155:235-241. doi: 10.1016/j.envres.2017.02.009. [Epub ahead of print]

263. Xu A, et al. Acute Effects of Particulate Air Pollution on Ischemic Heart Disease Hospitalizations in Shanghai, China. *Int J Environ Res Public Health.* 2017 Feb 9;14(2). pii: E168. doi: 10.3390/ijerph14020168.
264. Fiordelisi A, et al. The mechanisms of air pollution and particulate matter in cardiovascular diseases. *Heart Fail Rev.* 2017 Mar 16. doi: 10.1007/s10741-017-9606-7. [Epub ahead of print]
265. Miller MR, et al. Inhaled Nanoparticles Accumulate at Sites of Vascular Disease. *ACS Nano.* 2017 Apr 26. doi: 10.1021/acsnano.6b08551. [Epub ahead of print]
266. Chen R, et al. Fine Particulate Air Pollution and Daily Mortality: A Nationwide Analysis in 272 Chinese Cities. *Am J Respir Crit Care Med.* 2017 Mar 1. doi: 10.1164/rccm.201609-1862OC. [Epub ahead of print]
267. Li G, et al. Association between fine ambient particulate matter and daily total mortality: An analysis from 160 communities of China. *Sci Total Environ.* 2017 May 1;599-600:108-113. doi: 10.1016/j.scitotenv.2017.04.010. [Epub ahead of print]
268. Desikan A, et al. Outdoor air pollution as a possible modifiable risk factor to reduce mortality in post-stroke population. *Neural Regen Res.* 2017 Mar;12(3):351-353. doi: 10.4103/1673-5374.202917.
269. Bell G, et al. Association of Air Pollution Exposures With High-Density Lipoprotein Cholesterol and Particle Number: The Multi-Ethnic Study of Atherosclerosis. *Arteriosclerosis, Thrombosis, and Vascular Biology.* 2017;37:976-982

270. Gondalia R, et al. Genome-wide Association Study of Susceptibility to Particulate Matter-Associated QT Prolongation. *Environ Health Perspect*. 2017 Jun 8;125(6):067002. doi: 10.1289/EHP347.
271. Zhang Y, Peng M, Yu C, Zhang L. Burden of mortality and years of life lost due to ambient PM10 pollution in Wuhan, China. *Environ Pollut*. 2017 Jul 27;230:1073-1080. doi: 10.1016/j.envpol.2017.07.053. [Epub ahead of print]
272. Makar M, Antonelli J, Di Q, Cutler D, Schwartz J, Dominici F. Estimating the Causal Effect of Low Levels of Fine Particulate Matter on Hospitalization. *Epidemiology*. 2017 Sep;28(5):627-634. doi: 10.1097/EDE.0000000000000690.
273. Liu H, et al. Air Pollution and Hospitalization for Acute Myocardial Infarction in China. *Am J Cardiol*. 2017 Jun 15. pii: S0002-9149(17)30954-2. doi: 10.1016/j.amjcard.2017.06.004. [Epub ahead of print]
274. Guo Y, et al. Time series analysis of ambient air pollution effects on daily mortality. *Environ Sci Pollut Res Int*. 2017 Jul 13. doi: 10.1007/s11356-017-9502-7. [Epub ahead of print]
275. Shuster-Meiseles T, et al. ROS-generating/ARE-activating capacity of metals in roadway particulate matter deposited in urban environment. *Environmental Research*, 2016; 146: 252 DOI: 10.1016/j.envres.2016.01.009
276. Fuller CH, Feeser KR, Sarnat JA, O'Neill MS. Air pollution, cardiovascular endpoints and susceptibility by stress and material resources: a systematic review of the evidence. *Environ Health*. 2017 Jun 14;16(1):58. doi: 10.1186/s12940-017-0270-0. Review.

277. Di Q, et al. Air Pollution and Mortality in the Medicare Population. *New England Journal of Medicine*, 2017; 376 (26): 2513 DOI: 10.1056/NEJMoa1702747
278. Yang WY, et al. Left ventricular function in relation to chronic residential air pollution in a general population. *Eur J Prev Cardiol.* 2017 Jan 1:2047487317715109. doi: 10.1177/2047487317715109. [Epub ahead of print]
279. Chiu HF, Weng YH, Chiu YW, Yang CY. Short-Term Effects of Ozone Air Pollution on Hospital Admissions for Myocardial Infarction: A Time-Stratified Case-Crossover Study in Taipei. *J Toxicol Environ Health A*. 2017 Jun 9:1-7. doi: 10.1080/15287394.2017.1321092. [Epub ahead of print]
280. Carll AP, et al. Inhaled ambient-level traffic-derived particulates decrease cardiac vagal influence and baroreflexes and increase arrhythmia in a rat model of metabolic syndrome. *Part Fibre Toxicol.* 2017 May 25;14(1):16. doi: 10.1186/s12989-017-0196-2.
281. Zhang C, et al. Association between air pollution and cardiovascular mortality in Hefei, China: A time-series analysis. *Environ Pollut.* 2017 Aug 7. pii: S0269-7491(16)32799-3. doi: 10.1016/j.envpol.2017.06.022. [Epub ahead of print]
282. Goodson J, et al. In utero exposure to diesel exhaust particulates is associated with an altered cardiac transcriptional response to transverse aortic constriction and altered DNA methylation. *The FASEB Journal*, 2017; fj.201700032R DOI: 10.1096/fj.201700032R
283. Huang C, et al. Potential Cardiovascular and Total Mortality Benefits of Air Pollution Control in Urban China. *Circulation*.

2017 Sep 7. pii: CIRCULATIONAHA.116.026487. doi: 10.1161/CIRCULATIONAHA.116.026487. [Epub ahead of print.]

284. Ebenstein A, et al. New evidence on the impact of sustained exposure to air pollution on life expectancy from China's Huai River Policy. *Proceedings of the National Academy of Sciences*, 2017; 201616784 DOI: 10.1073/pnas.1616784114

285. Sørensen M, et al. Long-Term Exposure to Road Traffic Noise and Nitrogen Dioxide and Risk of Heart Failure: A Cohort Study. *Environ Health Perspect*. 2017 Sep 26;125(9):097021. doi: 10.1289/EHP1272.

286. Fang X, et al. Relationship between fine particulate matter, weather condition and daily non-accidental mortality in Shanghai, China: A Bayesian approach. *PLoS One*. 2017 Nov 9;12(11):e0187933. doi: 10.1371/journal.pone.0187933. eCollection 2017.

287. Kim H, et al. Cardiovascular Effects of Long-Term Exposure to Air Pollution: A Population-Based Study With 900 845 Person-Years of Follow-up. *J Am Heart Assoc*. 2017 Nov 8;6(11). pii: e007170. doi: 10.1161/JAHA.117.007170.

288. Holnicki P, et al. Burden of Mortality and Disease Attributable to Multiple Air Pollutants in Warsaw, Poland. *Int J Environ Res Public Health*. 2017 Nov 8;14(11). pii: E1359. doi: 10.3390/ijerph14111359.

289. Abrams J, et al. Associations between Ambient Fine Particulate Oxidative Potential and Cardiorespiratory Emergency Department Visits. OCTOBER 2017 | VOLUME 125 | ISSUE 10. *Environ Health Perspect*; DOI:10.1289/EHP1545

290. Ward-Caviness CK, et al. Associations Between Residential Proximity to Traffic and Vascular Disease in a Cardiac Catheterization Cohort. *Arterioscler Thromb Vasc Biol.* 2017 Nov 30. pii: ATVBHA.117.310003. doi: 10.1161/ATVBHA.117.310003. [Epub ahead of print].
291. Magalhaes S, et al. Impacts of exposure to black carbon, elemental carbon, and ultrafine particles from indoor and outdoor sources on blood pressure in adults: A review of epidemiological evidence. *Environ Res.* 2017 Nov 28;161:345-353. doi: 10.1016/j.envres.2017.11.030. [Epub ahead of print]
292. Cappellari M, et al. Association between short- and medium-term air pollution exposure and risk of mortality after intravenous thrombolysis for stroke. *J Thromb Thrombolysis.* 2017 Nov 28. doi: 10.1007/s11239-017-1589-7. [Epub ahead of print]
293. Corrigan AE, et al. Fine particulate matters: The impact of air quality standards on cardiovascular mortality. *Environ Res.* 2017 Nov 28;161:364-369. doi: 10.1016/j.envres.2017.11.025. [Epub ahead of print]
294. Sinharay R, et al. Respiratory and cardiovascular responses to walking down a traffic-polluted road compared with walking in a traffic-free area in participants aged 60 years and older with chronic lung or heart disease and age-matched healthy controls: a randomised, crossover. *The Lancet.* 2017; DOI: 10.1016/j.laneuro.2017.09.018
295. Parker JD, et al. Particulate Matter Air Pollution Exposure and Heart Disease Mortality Risks by Race and Ethnicity in the United States: 1997-2009 NHIS with Mortality Followup Through 2011. *Circulation.* 2017 Dec 13. pii: 10.1161/CIRCULATIONAHA.117.029000

CIRCULATIONAHA.117.029376. doi:
10.1161/CIRCULATIONAHA.117.029376. [Epub ahead of print]

296. Kim SE, et al. Associations between mortality and prolonged exposure to elevated particulate matter concentrations in East Asia. *Environ Int.* 2017 Oct 30. pii: S0160-4120(17)30909-1. doi: 10.1016/j.envint.2017.10.010. [Epub ahead of print]

297. Chen CC, et al. Association between gaseous air pollution and hospital admissions for hypertension in Taipei, Taiwan. *J Toxicol Environ Health A.* 2017 Dec 22:1-7. doi: 10.1080/15287394.2017.1395573. [Epub ahead of print]

298. Tibuakuu M, et al. Exposure to ambient air pollution and calcification of the mitral annulus and aortic valve: the multi-ethnic study of atherosclerosis (MESA). *Environ Health.* 2017 Dec 21;16(1):133. doi: 10.1186/s12940-017-0346-x.

299. Qian D, et al. Association of Short-term Exposure to Air Pollution With Mortality in Older Adults. *JAMA.* 2017;318(24):2446-2456. doi:10.1001/jama.2017.17923

300. Carter JD, et al. Ultrafine particulate matter exposure impairs vasorelaxant response in superoxide dismutase 2-deficient murine aortic rings. *J Toxicol Environ Health A.* 2018;81(5):106-115. doi: 10.1080/15287394.2017.1420504. Epub 2017 Dec 26.

301. Ji X, et al. Potential Role of Inflammation in Associations between Particulate Matter and Heart Failure. *Curr Pharm Des.* 2018 Jan 10. doi: 10.2174/1381612824666180110150550. [Epub ahead of print]

302. Bai L, et al. Exposure to Ambient Ultrafine Particles and Nitrogen Dioxide and Incident Hypertension and Diabetes. *Epidemiology*. 2018 Jan 9. doi: 10.1097/EDE.0000000000000798. [Epub ahead of print]
303. Guan T, et al. Differential Susceptibility in Ambient Particle-Related First-Ever Stroke Onset Risk: Findings From a National Case-Crossover Study. *Am J Epidemiol*. 2018 Jan 17. doi: 10.1093/aje/kwy007. [Epub ahead of print]
304. Buteau S, et al. Associations between ambient air pollution and daily mortality in a cohort of congestive heart failure: Case-crossover and nested case-control analyses using a distributed lag nonlinear model. *Environ Int*. 2018 Jan 17. pii: S0160-4120(17)31563-5. doi: 10.1016/j.envint.2018.01.003. [Epub ahead of print]
305. Zhang Z, et al. Long-Term Exposure to Fine Particulate Matter, Blood Pressure, and Incident Hypertension in Taiwanese Adults. *Environ Health Perspect*. 2018 Jan 18;126(1):017008. doi: 10.1289/EHP2466.
306. Guan L, et al. PM2.5 inhalation induces intracranial atherosclerosis which may be ameliorated by omega 3 fatty acids. *Oncotarget*. 2017 Dec 16;9(3):3765-3778. doi: 10.18632/oncotarget.23347. eCollection 2018 Jan 9.
307. Rasche M, et al. Rapid increases in nitrogen oxides are associated with acute myocardial infarction: A case-crossover study. *Eur J Prev Cardiol*. 2018 Jan 1:2047487318755804. doi: 10.1177/2047487318755804. [Epub ahead of print]
308. Salameh P, et al. Hypertension prevalence and living conditions related to air pollution: results of a national

epidemiological study in Lebanon. Environ Sci Pollut Res Int. 2018 Feb 13. doi: 10.1007/s11356-018-1411-x. [Epub ahead of print]

309. Baumgartner J, et al. Household air pollution and measures of blood pressure, arterial stiffness and central haemodynamics. Heart. 2018 Feb 9. pii: heartjnl-2017-312595. doi: 10.1136/heartjnl-2017-312595. [Epub ahead of print]
310. Hadley MB, et al. Developing a Clinical Approach to Air Pollution and Cardiovascular Health. Circulation. 2018 Feb 13;137(7):725-742. doi: 10.1161/CIRCULATIONAHA.117.030377.
311. An Z, et al. Impact of Particulate Air Pollution on Cardiovascular Health. Curr Allergy Asthma Rep. 2018 Feb 22;18(3):15. doi: 10.1007/s11882-018-0768-8.
312. Erqou S, et al. Particulate Matter Air Pollution and Racial Differences in Cardiovascular Disease Risk. Arterioscler Thromb Vasc Biol. 2018 Mar 15. pii: ATVBBAHA.117.310305. doi: 10.1161/ATVBBAHA.117.310305. [Epub ahead of print]
313. Nyhan MM, et al. Associations Between Ambient Particle Radioactivity and Blood Pressure: The NAS (Normative Aging Study). J Am Heart Assoc. 2018 Mar 15;7(6). pii: e008245. doi: 10.1161/JAHA.117.008245.
314. Kulick ER, et al. Residential Proximity to Major Roadways and Risk of Incident Ischemic Stroke in NOMAS (The Northern Manhattan Study). Stroke. 2018 Mar 14. pii: STROKEAHA.117.019580. doi: 10.1161/STROKEAHA.117.019580. [Epub ahead of print]

315. Corlin L, et al. Longitudinal associations of long-term exposure to ultrafine particles with blood pressure and systemic inflammation in Puerto Rican adults. *Environ Health*. 2018 Apr 5;17(1):33. doi: 10.1186/s12940-018-0379-9.
316. Xie X, et al. Long-Term Effects of Ambient Particulate Matter (With an Aerodynamic Diameter $\leq 2.5 \mu\text{m}$) on Hypertension and Blood Pressure and Attributable Risk Among Reproductive-Age Adults in China. *J Am Heart Assoc*. 2018 Apr 26;7(9). pii: e008553. doi: 10.1161/JAHA.118.008553.
317. Khan R, et al. Association between short-term exposure to fine particulate matter and daily emergency room visits at a cardiovascular hospital in Dhaka, Bangladesh. *Sci Total Environ*. 2019 Jan 1;646:1030-1036. doi: 10.1016/j.scitotenv.2018.07.288. Epub 2018 Jul 21.
318. Nirel R, et al. Fine and Coarse Particulate Matter Exposures and Associations with Acute Cardiac Events among Participants in a Telemedicine Service: A Case-Crossover Study. First Published: 11 September 2018, DOI: <https://doi.org/10.1289/EHP2596>
319. Bai L, et al. Associations of Long-Term Exposure to Ultrafine Particles and Nitrogen Dioxide with Increased Incidence of Congestive Heart Failure and Acute Myocardial Infarction. *Am J Epidemiol*. 2018 Aug 28. doi: 10.1093/aje/kwy194. [Epub ahead of print]
320. Xie X, et al. Long-term exposure to fine particulate matter and tachycardia and heart rate: Results from 10 million reproductive-age adults in China. *Environ Pollut*. 2018 Aug 11;242(Pt B):1371-1378. doi: 10.1016/j.envpol.2018.08.022. [Epub ahead of print]

321. Aung N, et al. Association Between Ambient Air Pollution and Cardiac Morpho-Functional Phenotypes, insights From the UK Biobank Population Imaging Study. Originally published 3 Aug 2018 Circulation. 2018;0:CIRCULATIONAHA.118.034856
322. Yang BY, et al. Exposure to ambient air pollution and blood lipids in adults: The 33 Communities Chinese Health Study. Environ Int. 2018 Jul 23;119:485-492. doi: 10.1016/j.envint.2018.07.016. [Epub ahead of print]
323. Duan C, et al. Five-year exposure to PM2.5 and ozone and subclinical atherosclerosis in late midlife women: The Study of Women's Health Across the Nation. Int J Hyg Environ Health. 2018 Sep 17. pii: S1438-4639(18)30155-X. doi: 10.1016/j.ijheh.2018.09.001. [Epub ahead of print]
324. Downward GS, et al. Long-Term Exposure to Ultrafine Particles and Incidence of Cardiovascular and Cerebrovascular Disease in a Prospective Study of a Dutch Cohort. Environ Health Perspect. 2018 Dec;126(12):127007. doi: 10.1289/EHP3047.
325. Buszman PE, et al. Impact of air pollution on hospital patients admitted with ST- and non-ST-segment elevation myocardial infarction in heavily polluted cities within the European Union. Cardiol J. 2018 Dec 19. doi: 10.5603/CJ.a2018.0156. [Epub ahead of print]
326. Sofianopoulou E, et al. Traffic exposures, air pollution and outcomes in pulmonary arterial hypertension: A United Kingdom cohort study analysis. Eur Respir J. 2019 Mar 28. pii: 1801429. doi: 10.1183/13993003.01429-2018. [Epub ahead of print]
327. Geng J, et al. PM2.5 promotes plaque vulnerability at different stages of atherosclerosis and the formation of foam cells

via TLR4/MyD88/NF κ B pathway. Ecotoxicol Environ Saf. 2019 Mar 25;176:76-84. doi: 10.1016/j.ecoenv.2019.03.068. [Epub ahead of print]

328. Malik AO, et al. Association of Long-Term Exposure to Particulate Matter and Ozone With Health Status and Mortality in Patients After Myocardial Infarction. Circ Cardiovasc Qual Outcomes. 2019 Apr;12(4):e005598. doi: 10.1161/CIRCOUTCOMES.119.005598.

329. Ntarladima AM, et al. Relations between air pollution and vascular development in 5-year old children: a cross-sectional study in the Netherlands. Environ Health. 2019 May 16;18(1):50. doi: 10.1186/s12940-019-0487-1.

330. Madhloum N. et al. Neonatal blood pressure in association with prenatal air pollution exposure, traffic, and land use indicators: An ENVIRONAGE birth cohort study. Environ Int. 2019 Jun 18;130:104853. doi: 10.1016/j.envint.2019.05.047. [Epub ahead of print]

331. Wang M et al. Association of Estimated Long-term Exposure to Air Pollution and Traffic Proximity With a Marker for Coronary Atherosclerosis in a Nationwide Study in China JAMA Netw Open. 2019;2(6):e196553.
doi:10.1001/jamanetworkopen.2019.6553

332. Xu J, et al. Study on the association between ambient air pollution and daily cardiovascular death in Hefei, China. Environ Sci Pollut Res Int. 2019 Dec 4. doi: 10.1007/s11356-019-06867-4. [Epub ahead of print]

333. Stieb D, et al. Associations between air pollution and cardio-respiratory physiological measures in older adults

exercising outdoors. *Int J Environ Health Res.* 2019 Dec 12:1-14. doi: 10.1080/09603123.2019.1699506. [Epub ahead of print] .

334. Wan Q, et al. Acceleratory effects of ambient fine particulate matter on the development and progression of atherosclerosis in apolipoprotein E knockout mice by down-regulating CD4+CD25+Foxp3+ regulatory T cells. *Toxicol Lett.* 2019 Sep 9. pii: S0378-4274(19)30270-X. doi: 10.1016/j.toxlet.2019.09.005. [Epub ahead of print]

335. Cheng FJ, et al. Association between ambient air pollution and out-of-hospital cardiac arrest: are there potentially susceptible groups? *J Expo Sci Environ Epidemiol.* 2019 Oct 2. doi: 10.1038/s41370-019-0140-7. [Epub ahead of print]

336. Cowell WJ, et al. Prenatal Exposure to PM2.5 and Cardiac Vagal Tone during Infancy: Findings from a Multiethnic Birth Cohort. *Environmental Health Perspectives,* 2019; 127 (10): 107007 DOI: 10.1289/EHP4434

337. Ljungman P, et al. Long-Term Exposure to Particulate Air Pollution, Black Carbon, and Their Source Components in Relation to Ischemic Heart Disease and Stroke. *Environmental Health Perspectives,* 2019; 127 (10): 107012 DOI: 10.1289/EHP4757

338. Marris CR, et al. Polyaromatic hydrocarbons in pollution: A heart-breaking matter. December 2019, *The Journal of Physiology.*

339. Nhong NT, et al. Exposure to air pollution and risk of hospitalization for cardiovascular diseases amongst Vietnamese adults: Case-crossover study. *Sci Total Environ.* 2019 Nov

3;703:134637. doi: 10.1016/j.scitotenv.2019.134637. [Epub ahead of print]

340. Salimi S, et al. Long-term exposure to particulate air pollution and brachial artery flow-mediated dilation in the Old Order Amish. *Environ Health*. 2020 May 14;19(1):50. doi: 10.1186/s12940-020-00593-y.

341. Huynh Q, et al. Long-term exposure to ambient air pollution is associated with coronary artery calcification among asymptomatic adults. *Eur Heart J Cardiovasc Imaging*. 2020 May 1. pii: jeaa073. doi: 10.1093/ehjci/jeaa073. [Epub ahead of print]

342. Jones C, et al. Out-of-Hospital Cardiac Arrests and Wildfire-Related Particulate Matter During 2015–2017 California Wildfires. *Journal of the American Heart Association*, 2020; DOI:

343. Farhadi Z, et al. Association between PM2.5 and risk of hospitalization for myocardial infarction: a systematic review and a meta-analysis. *BMC Public Health*. 2020 Mar 12;20(1):314. doi: 10.1186/s12889-020-8262-3.

344. Pranata R, et al. A time-to-event analysis on air pollutants with the risk of cardiovascular disease and mortality: A systematic review and meta-analysis of 84 cohort studies. *J Evid Based Med*. 2020 Mar 13. doi: 10.1111/jebm.12380. [Epub ahead of print]

345. Rosa MJ, et al. Identifying critical windows of prenatal particulate matter (PM2.5) exposure and early childhood blood pressure. *Environ Res*. 2019 Dec 23;182:109073. doi: 10.1016/j.envres.2019.109073. [Epub ahead of print]

346. Liu L, et al. Air Pollution, Physical Activity and Cardiovascular Function of Patients with Implanted Cardioverter Defibrillators: A Randomized Controlled Trial of Indoor Versus Outdoor Activity. *J Occup Environ Med.* 2019 Dec 26. doi: 10.1097/JOM.0000000000001795. [Epub ahead of print]
347. Miller MR, et al. Oxidative stress and the cardiovascular effects of air pollution. *Free Radic Biol Med.* 2020 Jan 7. pii: S0891-5849(19)32275-0.
348. Zhao B, et al. Short-term exposure to ambient fine particulate matter and out-of-hospital cardiac arrest: a nationwide case-crossover study in Japan. *The Lancet Planetary Health,* 2020; 4 (1): e15 DOI: 10.1016/S2542-5196(19)30262-1
349. Rabito FA, et al. The Association Between Short-term Residential Black Carbon Concentration on Blood Pressure in a General Population Sample. *Indoor Air.* 2020 Jan 31. doi: 10.1111/ina.12651. [Epub ahead of print]
350. Tousoulis D, et al. Acute exposure to diesel affects inflammation and vascular function. *European Journal of Preventive Cardiology,* 2020; 204748731989802 DOI: 10.1177/2047487319898020
351. Chen K, et al. Hourly Exposure to Ultrafine Particle Metrics and the Onset of Myocardial Infarction in Augsburg, Germany. *Environmental Health Perspectives,* 2020; 128 (1): 017003 DOI: 10.1289/EHP5478
352. Chen H, et al. Understanding the joint impacts of fine particulate matter concentration and composition on the incidence and mortality of cardiovascular disease: a

component-adjusted approach. *Environ Sci Technol*. 2020 Feb 26. doi: 10.1021/acs.est.9b06861. [Epub ahead of print]

353. Feng L, Wei J, Liang S, Sun Z, Duan J. miR-205/IRAK2 signaling pathway is associated with urban airborne PM_{2.5}-induced myocardial toxicity. *Nanotoxicology*. 2020 Sep 3:1-15. doi: 10.1080/17435390.2020.1813824. Online ahead of print. PMID: 32880505

354. Yitshak-Sade M, et al. Lowering Air Pollution Levels in Massachusetts May Prevent Cardiovascular Hospital Admissions. *J Am Coll Cardiol*. 2020 May 26;75(20):2642-2644. doi: 10.1016/j.jacc.2020.03.056. No abstract available.

355. Cramer J, et al. Long-Term Exposure to Air Pollution and Incidence of Myocardial Infarction: A Danish Nurse Cohort Study. *Environ Health Perspect*. 2020 May;128(5):57003. doi: 10.1289/EHP5818. Epub 2020 May 6.

356. Kim IS, Yang PS, Jang E, Jung H, You SC, Yu HT, Kim TH, Uhm JS, Pak HN, Lee MH, Kim JY, Joung B. Long-term PM_{2.5} exposure and the clinical application of machine learning for predicting incident atrial fibrillation. *Sci Rep*. 2020 Oct 1;10(1):16324. doi: 10.1038/s41598-020-73537-8. PMID: 33004983; PMCID: PMC7530980.356.

357. Jiang M, Meng X, Qi L, Hu X, Xu R, Yan M, Shi Y, Meng X, Li W, Xu Y, Chen S, Zhu T, Gong J. The health effects of wearing face masks on cardiopulmonary system of healthy young adults: A double-blinded, randomized crossover trial. *Int J Hyg Environ Health*. 2021 Jul 12;236:113806. doi: 10.1016/j.ijheh.2021.113806. Epub ahead of print. PMID: 34265631.

358. Abohashem S, et al. A leucopoietic-arterial axis underlying the link between ambient air pollution and cardiovascular disease in humans. European Heart Journal, 2021 DOI: 10.1093/eurheartj/ehaa982

359. Huang M, et al. Effects of Ambient Air Pollution on Blood Pressure Among Children and Adolescents: A Systematic Review and Meta-Analysis. Journal of the American Heart Association, 2021; DOI: 10.1161/JAHA.120.017734

360. Prunicki M, et al. Air pollution exposure is linked with methylation of immunoregulatory genes, altered immune cell profiles, and increased blood pressure in children. Scientific Reports, 2021; 11 (1) DOI: 10.1038/s41598-021-83577-3

361. Korsiak J, Perepeluk KL, Peterson NG, Kulka R, Weichenthal S. Air pollution and retinal vessel diameter and blood pressure in school-aged children in a region impacted by residential biomass burning. Sci Rep. 2021 Jun 17;11(1):12790. doi: 10.1038/s41598-021-92269-x. PMID: 34140605

362. Li X, Haberzettl P, Conklin DJ, Bhatnagar A, Rouchka EC, Zhang M, O'Toole TE. Exposure to Fine Particulate Matter Air Pollution Alters mRNA and miRNA Expression in Bone Marrow-Derived Endothelial Progenitor Cells from Mice. Genes (Basel). 2021 Jul 10;12(7):1058. doi: 10.3390/genes12071058. PMID: 34356074; PMCID: PMC8307414.

363. WU Jun Hui, WU Yao, WANG Zi Jing, TIAN Yao Hua, WU Yi Qun, WU Tao, WANG Meng Ying, WANG Xiao Wen, WANG Jia Ting, HU Yong Hua. Ambient Particulate Matter Pollution and Hospital Visits for Cardiac Arrhythmia in Beijing, China[J]. Biomedical and Environmental Sciences, 2021, 34(7): 562-566. doi: 10.3967/bes2021.077

364. Lim Y_H, et al. Long-Term Exposure to Air Pollution, Road Traffic Noise, and Heart Failure Incidence: The Danish Nurse Cohort. *Journal of the American Heart Association*, 2021; DOI: 10.1161/JAHA.121.021436
365. Zhu Y, et al. Short-term exposure to traffic-related air pollution and STEMI events: Insights into STEMI onset and related cardiac impairment. *Sci Total Environ*. 2022 Feb 28:154210. doi: 10.1016/j.scitotenv.2022.154210
366. Chen R, Jiang Y, Hu J, Chen H, Li H, Meng X, Ji JS, Gao Y, Wang W, Liu C, Fang W, Yan H, Chen J, Wang W, Xiang D, Su X, Yu B, Wang Y, Xu Y, Wang L, Li C, Chen Y, Bell ML, Cohen AJ, Ge J, Huo Y, Kan H. Hourly Air Pollutants and Acute Coronary Syndrome Onset In 1.29 Million Patients. *Circulation*. 2022 Apr 22. doi: 10.1161/CIRCULATIONAHA.121.057179. Epub ahead of print. PMID: 35450432.
367. Kramarz E, Piotrowicz R, Stańczyk A. The impact of chronic exposure to air pollution on electrocardiographic parameters. *Int J Occup Med Environ Health*. 2022 Mar 15:145167. doi: 10.13075/ijomeh.1896.01682
368. Li B, et al. Associations of long-term ambient air pollution and traffic-related pollution with blood pressure and hypertension defined by the different guidelines worldwide: the CHCN-BTH study. *Environ Sci Pollut Res Int*. 2022 Apr 21. doi: 10.1007/s11356-022-20227-9
369. Zhang Q, Du X, Li H, Jiang Y, Zhu X, Zhang Y, Niu Y, Liu C, Ji J, Chillrud SN, Cai J, Chen R, Kan H. Cardiovascular effects of traffic-related air pollution: A multi-omics analysis from a randomized, crossover trial. *J Hazard Mater*. 2022 Apr

29;435:129031. doi: 10.1016/j.jhazmat.2022.129031. Epub ahead of print. PMID: 35523096.

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Pollution and the Brain

- * **The systemic inflammation caused by air pollution also affects the brain**
- * **Air pollution components, including toxic, metallic nanoparticles, reach the brain and can penetrate deeply into the parenchyma beginning in infancy.**
- * **Many of the compounds adsorbed to particulate matter are neurotoxic.**
- * **Air pollution causes CNS oxidative stress, neuroinflammation, neuronal damage, neuronal loss, loss of brain mass in key areas that control memory, cortical stress measured by EEG, enhancement of Alzheimer type-abnormal filamentous proteins (beta amyloid and phosphorylated tau), BBB and microglial (immune system) changes, and**

cerebrovascular damage. Many of these changes can be found in infants, children and young adults.

*** Air pollution exposure is associated with almost the full range of clinical neurologic disorders throughout the age spectrum, including lower intelligence, diminished motor function, attention deficit and behavioral problems, decreased cognition and accelerated dementia in adults, delinquent behavior in adolescents, higher rates of violent crime, higher rates of strokes, ALS, relapses in multiple sclerosis, autism, impaired olfactory sense, Parkinson's, and other neurodegenerative diseases, depression, anxiety, substance abuse, schizophrenia and suicide. Air pollution is even associated with impaired cognition and decision making among numerous professions—indoor office workers, stock traders, chess players, and baseball umpires, for example. Air pollution reduces productivity of factory workers and call center employees.**

*** Acute air pollution exposure on the way to school affects students' attention span during the ensuing school day. Air pollution in the room where students take tests reduces test scores on the same day, and air purifiers improve scores, even in areas where the pollution is below the EPA's standards.**

***Air pollution impairs olfactory function (i.e. sense of smell).**

***Carbon monoxide in air pollution increases the risk of seizures in epileptic patients.**

*** Prenatal exposure to air pollution is particularly harmful to fetal brain development, even causing loss of white matter involving the left hemisphere, corpus callosum and**

hippocampus, which results in impaired memory, cognition and behavioral disorders in childhood.

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1. Calderon-Garciduenas L, Mora-Tiscareno A, Ontiveros E, et al. Air pollution, cognitive deficits and brain abnormalities: a pilot study with children and dogs. *Brain Cogn.* 2008 Nov;68(2):117-27. Epub 2008 Jun 11..
2. Calderon-Garciduenas L, Solt AC, et al. Long-term air pollution exposure is associated with neuroinflammation, an altered innate immune response, disruption of the blood-brain barrier, ultrafine particulate deposition, and accumulation of amyloid beta-42 and alpha-synuclein in children and young adults. *Toxicol Pathol.* 2008;36(2): 289-310. Epub 2008 Mar 18
3. Calderon-Garciduenas L, Franco-Lira M, Torres-Jardon R. Pediatric Respiratory and Systemic Effects of Chronic Air Pollution Exposure: Nose, Lung, Heart, and Brain Pathology. *Toxicol Pathol*, Vol. 35, No1, 154-162 (2007)
4. Hartz A, Bauer B, Block M, Diesel exhaust particles induce oxidative stress, proinflammatory signaling, and P-glycoprotein, up-regulation at the blood-brain barrier. *The FASEB Journal* 2008;22:2723-2733.
5. Cruts B, van Etten L, Tornqvist H, et al. Exposure to diesel exhaust induces changes in EEG in human volunteers. *Part Fibre Toxicol.* 2008;5:4. March11. doi: 1186/1743-8977-5-4.

6. Suglia SF, et al. Association of Black Carbon with Cognition among Children in a Prospective Birth Cohort Study Am J Epidemiology 2008 167:280-286.
7. Wang, Z., Zeng, X, Zeng, Y, Wang, S. Chen, S. Association of traffic-related air pollution with children's neurobehavioral functions in Quanzhou, China. Environ Health Perspect. 2009 Oct; 117 (10):1612-8 Epub. 2009 May 11.
8. Volk H, Hertz-Pannier I, Delwiche L, Lurmann F, McConnell R. Residential Proximity to Freeways and Autism in the CHARGE study. Environ Health Perspect. 2010 Dec 13. [Epub ahead of print] PMID: 21156395.
9. Morales, E., Julvez, J., Torrent, M., et al. Association of Early-life Exposure to Household Gas Appliances and Indoor Nitrogen Dioxide With Cognition and Attention Behavior in Preschoolers. American Journal of Epidemiology 2009 169(11):1327-1336;
10. Suzuki, T., Oshio, S., Iwata, M., et al. In utero exposure to a low concentration of diesel exhaust affects spontaneous locomotor activity and monoaminergic system in male mice. Particle and Fibre Toxicology 2010, 7:7doi:10.1186/1743-8977-7-7
11. Freire, C., Ramos, R., Puertas, R., et al. Association of traffic-related air pollution with cognitive development in children. J Epidemiol Community Health 2010;64:223-228
12. Edwards SC, Jedrychowski W, Butscher M, Camann D, Kieltyka A, Mroz E, et al. 2010. Prenatal Exposure to Airborne Polycyclic Aromatic Hydrocarbons and Children's Intelligence at

Age 5 in a Prospective Cohort Study in Poland. Environ Health Perspect :-.
doi:10.1289/ehp.0901070

13. Calderón-Garcidueñas L, Reed W, Maronpot RR, Henríquez-Roldán C, Delgado-Chavez R, Calderón-Garcidueñas A, Dragustinovis I, Franco-Lira M, Aragón-Flores M, Solt AC, Altenburg M, Torres-Jardón R, Swenberg JA. Brain inflammation and Alzheimer's-like pathology in individuals exposed to severe air pollution. *Toxicol Pathol.* 2004 Nov-Dec;32(6):650-8.
14. Calderón-Garcidueñas L, Franco-Lira M, Henríquez-Roldán C, et al., "Urban air pollution: influences on olfactory function and pathology in exposed children and young adults," *Experimental and Toxicologic Pathology*, vol. 62, no. 1, pp. 91–102, 2010.
15. G. Oberdörster, Z. Sharp, V. Atudorei, A. Elder, R. Gelein, W. Kreyling and C. Cox. Translocation of Inhaled Ultrafine Particles to the Brain. *Inhalation Toxicology* 2004, Vol. 16, No. 6-7, Pages 437-445
16. Perera, FP, L Zhigang, R Whyatt, L Hoepner, S Wang, D Camann and V Rauh. 2009. 2009. Prenatal airborne polycyclic aromatic hydrocarbon exposure and child IQ at age 5 years. *Pediatrics* doi: 10.1542/peds.2008-3506.
17. Lopez I, Beltran-Parrazal1 L, Abhimanyu Amarnani A. Evidence for oxidative stress in the developing cerebellum of the rat after chronic mild carbon monoxide exposure (0.0025% in air) *BMC Neuroscience* 2009, 10:53doi: 10.1186/1471-2202-10-53
18. Zhou Z, Yuan T, Chen Y, Qu L, Rauh V, Zhang Y, Tang D, Perera F, Li T. Benefits of Reducing Prenatal Exposure to Coal-Burning Pollutants to Children's Neurodevelopment in China Research Article, published 14 Jul 2008 | doi:10.1289/ ehp.11480

19. Thomson, E.M. et al. (2007) Air pollution alters brain and pituitary endothelin-1 and inducible nitric oxide synthase gene expression. Environ. Res. 105, 224233
20. Peters, A. et al. (2006) Translocation and potential neurological effects of fine and ultrafine particles a critical update. Part. Fibre Toxicol. 3, 13
21. Hong, Y.C. et al. (2002) Air pollution: a new risk factor in ischemic stroke mortality. Stroke 33, 2165–2169
22. Kettunen, J. et al. (2007) Associations of fine and ultrafine particulate air pollution with stroke mortality in an area of low air pollution levels. Stroke 38, 918–922
23. Calderon-Garciduenas, L. et al. (2002) Air pollution and brain damage. Toxicol. Pathol. 30, 373–389
24. Calderon-Garciduenas, L. et al. (2003) DNA damage in nasal and brain tissues of canines exposed to air pollutants is associated with evidence of chronic brain inflammation and neurodegeneration. Toxicol. Pathol. 31, 524–538
25. Mateen F, Brook R. Air Pollution as an Emerging Global Risk Factor for Stroke JAMA
2011;305(12):1240-1241.doi:10.1001/jama.2011.352
26. Lopez IA, Acuna D, Beltran-Parrazal L, Lopez IE, Amarnani A, Cortes M, Edmond J. Evidence for oxidative stress in the developing cerebellum of the rat after chronic mild carbon monoxide exposure (0.0025% in air) BMC Neuroscience 2009, 10:53 (27 May 2009)
27. Morgan TE, Davis DA, Iwata N, Tanner JA, Snyder D, Ning Z, et al. 2011. Glutamatergic Neurons in Rodent Models Respond to

Nanoscale Particulate Urban Air Pollutants In Vivo and In Vitro.
Environ Health Perspect :- . doi:10.1289/ehp.1002973

28. Gackière F, Saliba L, Baude A, Bosler O, Strube C. Ozone inhalation activates stress-responsive regions of the central nervous system. *J Neurochem.* 2011 Apr 6. doi: 10.1111/j.1471-4159.2011.07267.x. [Epub ahead of print].
29. Calderón-Garcidueñas L, D'Angiulli A, Kulesza RJ, Torres-Jardón R, Osnaya N, Romero L, Keefe S, Herritt L, Brooks DM, Avila-Ramirez J, Delgado-Chávez R, Medina- Cortina H, González-González LO. Air pollution is associated with brainstem auditory nuclei pathology and delayed brainstem auditory evoked potentials. *Int J Dev Neurosci.* 2011 Mar 31. [Epub ahead of print]
30. Power MC, Weisskopf MG, Alexeef SE, Coull BA, Spiro A III, Schwartz J 2011. Traffic-Related Air Pollution and Cognitive Function in a Cohort of Older Men. *Environ Health Perspect* 119:682-687. doi:10.1289/ehp.1002767
31. Fonken LK, Xu X, Weil ZM, Chen G, Sun Q, Rajagopalan S, Nelson RJ. Air pollution impairs cognition, provokes depressive-like behaviors and alters hippocampal cytokine expression and morphology. *Molecular Psychiatry*, 2011; DOI: 10.1038/mp. 2011.76
32. Levesque S, Surace MJ, McDonald J, Block ML. Air pollution and the brain: Subchronic diesel exhaust exposure causes neuroinflammation and elevates early markers of neurodegenerative disease. *J Neuroinflammation.* 2011 Aug 24;8(1):105. [Epub ahead of print]
33. Guxens M, Aguilera I, Ballester F, Estarlich M, Fernández-Somoano A, Lertxundi A, Lertxundi N, Mendez MA,

Tardón A, Vrijheid M, Sunyer J. Prenatal Exposure to Residential Air Pollution and Infant Mental Development: Modulation by Antioxidants and Detoxification Factors. *Environ Health Perspect*. 2011 Aug 25. [Epub ahead of print]

34. Calderón-Garcidueñas L, Kavanaugh M, Block M, D'Angiulli A, Delgado-Chávez R, Torres-Jardón R, González-Maciel A, Reynoso-Robles R, Osnaya N, Villarreal-Calderon R, Guo R, Hua Z, Zhu H, Perry G, Diaz P. Neuroinflammation, Alzheimer's Disease- Associated Pathology, and Down-Regulation of the Prion-Related Protein in Air Pollution Exposed Children and Young Adults. *J Alzheimers Dis*. 2011 Sep 28. [Epub ahead of print]

35. Calderón-Garcidueñas L, Engle R, Mora-Tiscareño A, Styner M, Gómez-Garza G, Zhu H, Jewells V, Torres-Jardón R, Romero L, Monroy-Acosta ME, Bryant C, González- González LO, Medina-Cortina H, D'Angiulli A. Exposure to severe urban air pollution influences cognitive outcomes, brain volume and systemic inflammation in clinically healthy children. *Brain Cogn*. 2011 Oct 25. [Epub ahead of print]

36. Ranft U, Schikowski T, Sugiri D, Krutmann J, Krämer U. Long-term exposure to traffic-related particulate matter impairs cognitive function in the elderly. *Environ Res*. 2009 Nov;109(8):1004-11. Epub 2009 Sep 4.

37. Henn BC, Schnaas L, Ettinger AS, Schwartz J, Lamadrid-Figueroa H, Hernández- Avila M, et al. 2011. Associations of Early Childhood Manganese and Lead Coexposure with Neurodevelopment. *Environ Health Perspect* 120:126-131. <http://dx.doi.org/10.1289/ehp.1003300>

38. Ciesielski T, Weuve J, Bellinger DC, Schwartz J, Lanphear B, Wright RO 2012. Cadmium Exposure and Neurodevelopmental Outcomes in U.S. Children. *Environ Health Perspect* :-.
<http://dx.doi.org/10.1289/ehp.1104152>
39. Weuve J, Puett R, Schwartz J, Yanosky J, Laden F, Grodstein F. Exposure to Particulate Air Pollution and Cognitive Decline in Older Women *Arch Intern Med.* 2012;172(3):219-227.
doi:10.1001/archinternmed.2011.683
40. Perera FP, Tang D, Wang S, Vishnevetsky J, Zhang B, Diaz D, Camann D, Rauh V. Prenatal Polycyclic Aromatic Hydrocarbon (PAH) Exposure and Child Behavior at age 6-7. *Environ Health Perspect.* 2012 Mar 22. [Epub ahead of print]
41. Calderón-Garcidueñas L, Serrano-Sierra A, Torres-Jardón R, Zhu H, Yuan Y, Smith D, Delgado-Chávez R, Cross JV, Medina-Cortina H, Kavanaugh M, Guilarte TR. The impact of environmental metals in young urbanites' brains. *Exp Toxicol Pathol.* 2012 Mar 19. [Epub ahead of print]
42. Lewis J, Bench G, Myers O, Tinner B, Staines W, Barr E, Divine KK, Barrington W, Karlsson J (2005) Trigeminal uptake and clearance of inhaled manganese chloride in rats and mice. *Neurotoxicology* 26:113–23.
43. Calderón-Garcidueñas L, Mora-Tiscareño A, Styner M, Zhu H, Torres-Jardón R, Carlos E, Solorio-López E, Medina-Cortina H, Kavanaugh M, D'Angiulli A. White Matter Hyperintensities, Systemic Inflammation, Brain Growth, and Cognitive Functions in Children Exposed to Air Pollution. *J Alzheimers Dis.* 2012 Apr 18. [Epub ahead of print]

44. Moulton PV, Yang W. Air pollution, oxidative stress, and Alzheimer's disease. *J Environ Public Health*. 2012;2012:472751. Epub 2012 Mar 15.
45. Bos I, De Boever P, Emmerechts J, Buekers J, Vanoirbeek J, Meeusen R, Van Poppel M, Nemery B, Nawrot T, Panis LI. Changed gene expression in brains of mice exposed to traffic in a highway tunnel. *Inhal Toxicol*. 2012 Aug;24(10):676-86.
46. Boucher O, et al. Prenatal Methylmercury, Postnatal Lead Exposure, and Evidence of Attention Deficit/Hyperactivity Disorder among Inuit Children in Arctic Québec. *Environ Health Perspect* 120:0000–0000 (2012). <http://dx.doi.org/10.1289/ehp.1204976> [Online 21 September 2012]
47. Volk H, Lurmann F, Penfold B, Hertz-Pannier I, McConnell R. Traffic-Related Air Pollution, Particulate Matter, and Autism. *Arch Gen Psychiatry*. 2012;():1-7. doi: 10.1001/jamapsychiatry.2013.266.
48. Chen R, Zhang Y, Yang C, Zhao Z, Xu X, Kan H. Acute Effect of Ambient Air Pollution on Stroke Mortality in the China Air Pollution and Health Effects Study. *Stroke*. 2013 Feb 7. [Epub ahead of print]
49. Allen, JL, K Conrad, G Oberdörster, CJ Johnston, B Sleezer and BA Cory-Slechta. 2013. Developmental exposure to concentration ambient particles and preferences for immediate reward in mice. *Environmental Health Perspectives* 121(1): 32-38 <http://dx.doi.org/10.1289/ehp.1205505>.
50. Becerra T, Wilhelm M, Olsen J, Cockburn M, Ritz B. Ambient Air Pollution and Autism in Los Angeles County, California. *Environ Health Perspect* 121:380–386 (2013).

<http://dx.doi.org/10.1289/ehp.1205827> [Online 18 December 2012]

51. Lucchini, RG, S Zoni, S Guazzetti, E Bontempi, S Micheletti, K Broberg, G Parrinello and DR Smith. 2012. Inverse association of intellectual function with very low blood lead but not with manganese exposure in Italian adolescents. Environmental Research <http://dx.doi.org/10.1016/j.envres.2012.08.003>.

http://www.sciencenews.org/view/feature/id/58906/title/Destination_brain

52. Newman N, Ryan P, LeMasters G, Levin L, Bernstein D, Khurana-Hershey GK, Lockey JE, Villareal M, Reponen T, Grinshpun S, Sucharew H, Dietrich KN. Traffic- Related Air Pollution Exposure in the First Year of Life and Behavioral Scores at Seven Years of Age. Environ Health Perspect ():
.doi:10.1289/ehp.1205555

53. Roberts AL, et al. Perinatal Air Pollutant Exposures and Autism Spectrum Disorder in the Children of Nurses' Health Study II Participants. Environmental Health Perspectives, 2013 DOI: 10.1289/ehp.1206187

54. Chiu, YHM, DC Bellinger, BA Coull, S Anderson, R Barber, RO Wright and RJ Wright. 2013. Associations between traffic-related black carbon exposure and attention in a prospective birth cohort of urban children. Environmental Health Perspectives <http://ehp.niehs.nih.gov/1205940/>

55. Ljubimova JY, Kleinman MT, Karabalin NM, Inoue S, Konda B, Gangalum P, Markman JL, Ljubimov AV, Black KL. Gene expression changes in rat brain after short and long exposures to particulate matter in Los Angeles basin air: Comparison with

human brain tumors. *Exp Toxicol Pathol.* 2013 May 17. pii: S0940-2993(13)00054-7. doi: 10.1016/j.etp.2013.04.002. [Epub ahead of print]

56. Davis DA, Bortolato M, Godar SC, Sander TK, Iwata N, Pakbin P, Shih JC, Berhane K, McConnell R, Sioutas C, Finch CE, Morgan TE. Prenatal exposure to urban air nanoparticles in mice causes altered neuronal differentiation and depression-like responses. *PLoS One.* 2013 May 29;8(5):e64128. doi: 10.1371/journal.pone.0064128. Print 2013.
57. Jung CR, Lin YT, Hwang BF. Air Pollution and Newly Diagnostic Autism Spectrum Disorders: A Population-Based Cohort Study in Taiwan. *PLoS One.* 2013 Sep 25;8(9):e75510.
58. Davis DA, Akopian G, Walsh JP, Sioutas C, Morgan TE, Finch CE. Urban air pollutants reduce synaptic function of CA1 neurons via an NMDA/NO· pathway in vitro. *J Neurochem.* 2013 Aug 8. doi: 10.1111/jnc.12395. [Epub ahead of print]
59. Ejaz S, Anwar K, Ashraf M. MRI and neuropathological validations of the involvement of air pollutants in cortical selective neuronal loss. *Environ Sci Pollut Res Int.* 2013 Nov 15. [Epub ahead of print]
60. Chiu HF, Yang CY. Short-term effects of fine particulate air pollution on ischemic stroke occurrence: a case-crossover study. *J Toxicol Environ Health A.* 2013;76(21): 1188-97. doi:10.1080/15287394.2013.842463.
61. Volk, H, Kerin T, Lurmann F, Hertz-Pannier, I, McConnell R, Campbell D. Autism Spectrum Disorder: Interaction of Air Pollution with the MET Receptor Tyrosine Kinase Gene',

Epidemiology 14 November 2013 doi:
10.1097/EDE.0000000000000030

62. Costa L, et al. Neurotoxicants Are in the Air: Convergence of Human, Animal, and In Vitro Studies on the Effects of Air Pollution on the Brain. BioMed Research International. Volume 2014 (2014), Article ID 736385, 8 pages <http://dx.doi.org/10.1155/2014/736385>
63. Genc S, Zadeoglulari Z, Fuss SH, and Genc K, “The adverse effects of air pollution on the nervous system,” Journal of Toxicology, vol. 2012, Article ID 782462, 23 pages, 2012
64. Block ML, and Calderón-Garcidueñas L. “Air pollution: mechanisms of neuroinflammation and CNS disease,” Trends in Neurosciences, vol. 32, no. 9, pp. 506– 516, 2009
65. Calderón-Garcidueñas L, Azzarelli B, Acuna H. “Air pollution and brain damage,” Toxicologic Pathology, vol. 30, no. 3, pp. 373–389, 2002
66. Calderon-Garciduenas L, Cross JV, Franco-Lira M. “Brain immune interactions and air pollution: macrophage inhibitory factor (MIF), prion cellular protein (PrPC), interleukin-6 (IL-6), interleukin 1 receptor antagonist (IL-1Ra), and interleukin-2 (IL-2) in cerebrospinal fluid and MIF in serum differentiate urban children exposed to severe vs. low air pollution,” Frontiers in Neuroscience, vol. 7, article 183, 2013
67. Chen J-C, and Schwartz J, “Neurobehavioral effects of ambient air pollution on cognitive performance in US adults,” NeuroToxicology, vol. 30, no. 2, pp. 231–239, 2009

68. Boucher O, et al. Domain-Specific Effects of Prenatal Exposure to PCBs, Mercury, and Lead on Infant Cognition: Results from the Environmental Contaminants and Child Development Study in Nunavik. *Environ Health Perspect*; DOI:10.1289/ehp.1206323
69. Rzhetsky A, Bagley SC, Wang K, Lyttle CS, Cook EH Jr, et al. (2014) Environmental and State-Level Regulatory Factors Affect the Incidence of Autism and Intellectual Disability. *PLoS Comput Biol* 10(3): e1003518. doi:10.1371/journal.pcbi. 1003518
70. Tang D, Lee J, Muirhead L, Li TY, Qu L, Yu J, Perera F. Molecular and neurodevelopmental benefits to children of closure of a coal burning power plant in china. *PLoS One*. 2014 Mar 19;9(3):e91966. doi: 10.1371/journal.pone.0091966. eCollection 2014.
71. Perera F, Weiland K, Neidell M, Wang S. Prenatal exposure to airborne polycyclic aromatic hydrocarbons and IQ: Estimated benefit of pollution reduction. *J Public Health Policy*. 2014 May 8. doi: 10.1057/jphp.2014.14. [Epub ahead of print]
72. Allen J, et al. Early Postnatal Exposure to Ultrafine Particulate Matter Air Pollution: Persistent Ventriculomegaly, Neurochemical Disruption, and Glial Activation Preferentially in Male Mice. *Environ Health Perspect*; DOI:10.1289/ehp.1307984
73. Ailshire J, Clarke P. Fine Particulate Matter Air Pollution and Cognitive Function Among U.S. Older Adults. *Gerontol B Psychol Sci Soc Sci* (2014) doi: 10.1093/geronb/ gbu064. First published online: June 6, 2014

74. Ailshire JA, Crimmins EM. Fine Particulate Matter Air Pollution and Cognitive Function Among Older US Adults. *Am J Epidemiol.* 2014 Jun 24. pii: kwu155. [Epub ahead of print]
75. Liu J, Liu X, Wang W, McCauley L, Pinto-Martin J, Wang Y, Li L, Yan C, Rogan WJ. 2014. Blood lead levels and children's behavioral and emotional problems: a cohort study. *JAMA Pediatr;* doi:10.1001/jamapediatrics.2014.332.
76. Tonne C, Elbaz A, Beevers S, Singh-Manoux A. Traffic-related Air Pollution in Relation to Cognitive Function in Older Adults. *Epidemiology.* 2014 Jul 16. [Epub ahead of print]
77. Guxens M, Garcia-Estebe R, Giorgis-Allemand L, Forns J, Badaloni C, Ballester F, Beelen R, Cesaroni G, Chatzi L, de Agostini M, de Nazelle A, Eeftens M, Fernandez MF, Fernández-Somoano A, Forastiere F, Gehring U, Ghassabian A, Heude B, Jaddoe VW, Klümper C, Kogevinas M, Krämer U, Larroque B, Lertxundi A, Lertxuni N, Murcia M, Navel V, Nieuwenhuijsen M, Porta D, Ramos R, Roumeliotaki T, Slama R, Sørensen M, Stephanou EG, Sugiri D, Tardón A, Tiemeier H, Tiesler CM, Verhulst FC, Vrijkotte T, Wilhelm M, Brunekreef B, Pershagen G, Sunyer J. Air Pollution During Pregnancy and Childhood Cognitive and Psychomotor Development: Six European Birth Cohorts. *Epidemiology.* 2014 Jul 16. [Epub ahead of print]
78. von Ehrenstein OS, Aralis H, Cockburn M, Ritz B. In Utero Exposure to Toxic Air Pollutants and Risk of Childhood Autism. *Epidemiology.* 2014 Jul 21. [Epub ahead of print]
79. Volk HE, Kerin T, Lurmann F, Hertz-Pannier I, McConnell R, Campbell DB. Autism spectrum disorder: interaction of air pollution with the MET receptor tyrosine kinase gene.

Epidemiology. 2014 Jan;25(1):44-7. doi:
10.1097/EDE.0000000000000030.

80. Kim E, et al. Prenatal exposure to PM10 and NO₂ and children's neurodevelopment from birth to 24 months of age: mothers and Children's Environmental Health (MOCEH) study. Sci Total Environ. 2014 May 15;481:439-45. doi: 10.1016/j.scitotenv. 2014.01.107. Epub 2014 Mar 12.
81. Kalkbrenner AE, Windham GC, Serre ML, Akita Y, Wang X, Hoffman K, Thayer BP, Daniels JL. Particulate Matter Exposure, Prenatal and Postnatal Windows of Susceptibility, and Autism Spectrum Disorders. Epidemiology. 2014 Oct 3. [Epub ahead of print]
82. Jedrychowski WA, Perera FP, Camann D, Spengler J, Buttscher M, Mroz E, Majewska R, Flak E, Jacek R, Sowa A. Prenatal exposure to polycyclic aromatic hydrocarbons and cognitive dysfunction in children. Environ Sci Pollut Res Int. 2014 Sep 26. [Epub ahead of print]
83. Calderón-Garcidueñas L, Calderón-Garcidueñas A, Torres-Jardón R, Avila-Ramírez J, Kulesza RJ, Angiulli AD. Air pollution and your brain: what do you need to know right now. Prim Health Care Res Dev. 2014 Sep 26:1-17. [Epub ahead of print]
84. Perera FP, Chang H-w, Tang D, Roen EL, Herbstman J, et al. (2014) Early-Life Exposure to Polycyclic Aromatic Hydrocarbons and ADHD Behavior Problems. PLoS ONE 9(11): e111670. doi:10.1371/journal.pone.0111670
85. Raz R, Roberts AL, Lyall K, Hart JE, Just AC, Laden F, Weisskopf MG. Autism Spectrum Disorder and Particulate Matter

Air Pollution before, during, and after Pregnancy: A Nested Case-Control Analysis within the Nurses' Health Study II Cohort. Environ Health Perspect. 2014 Dec 18. [Epub ahead of print]

86. Tanga D, et al. Air pollution effects on fetal and child development: A cohort comparison in China. Environmental Pollution. Volume 185, February 2014, Pages 90– 96
87. Calderon-Garcidueñas L, et al. Decreases in Short Term Memory, IQ, and Altered Brain Metabolic Ratios in Urban Apolipoprotein ε 4 Children Exposed to Air Pollution. Journal of Alzheimer's Disease, February 2015 DOI: 10.3233/JAD-142685
88. Differential effects between one week and four weeks exposure to same mass of SO₂ on synaptic plasticity in rat hippocampus. Environ Toxicol. 2014 Dec 23. doi: 10.1002/tox.22093. [Epub ahead of print]
89. Malek AM, Barchowsky A, Bowser R, Heiman-Patterson T, Lacomis D, Rana S, Ada Youk, Talbott EO. Exposure to hazardous air pollutants and the risk of amyotrophic lateral sclerosis. Environ Pollut. 2014 Dec 23;197C:181-186. doi: 10.1016/j.envpol.2014.12.010. [Epub ahead of print]
90. Guarneros M, Hudson R, López-Palacios M, Drucker-Colín R. Reference Values of Olfactory Function for Mexico City Inhabitants. Arch Med Res. 2014 Dec 22. pii: S0188-4409(14)00283-5. doi: 10.1016/j.arcmed.2014.12.005. [Epub ahead of print]
91. Sunyer J, et al. Association between Traffic-Related Air Pollution in Schools and Cognitive Development in Primary School Children: A Prospective Cohort Study. PLOS medicine. Published: March 3, 2015 DOI: 10.1371/journal.pmed.1001792

92. Shah A, et al. Short term exposure to air pollution and stroke: systematic review and meta-analysis. *BMJ* 2015;350:h1295
93. Levy RJ. Carbon Monoxide Pollution and Neurodevelopment: A Public Health Concern. *Neurotoxicology and teratology* : 2015 Mar 12 pg
94. Peterson B, et al. Effects of Prenatal Exposure to Air Pollutants (Polycyclic Aromatic Hydrocarbons) on the Development of Brain White Matter, Cognition, and Behavior in Later Childhood. *JAMA Psychiatry*. Published online March 25, 2015. doi: 10.1001/jamapsychiatry.2015.57
95. Jacobson J, et al. Relation of Prenatal Methylmercury Exposure from Environmental Sources to Childhood IQ. *Environ Health Perspect*; DOI:10.1289/ehp. 1408554
96. Tang D, Lee J, Muirhead L, Li TY, Qu L, Yu J, et al. 2014. Molecular and neurodevelopmental benefits to children of closure of a coal burning power plant in China. *PLoS One* 9:e91966.
97. Power MC, et al. The relation between past exposure to fine particulate air pollution and prevalent anxiety: observational cohort study. *BMJ*, 2015; 350 (mar23 11): h1111 DOI: 10.1136/bmj.h1111
98. Brauer M. Air pollution, stroke, and anxiety. *BMJ*, 2015; 350 (mar23 11): h1510 DOI: 10.1136/bmj.h1510
99. Seamen N, et al. In Utero Fine Particle Air Pollution and Placental Expression of Genes in the Brain-Derived Neurotrophic Factor Signaling Pathway: An ENVIRONAGE Birth Cohort Study. *Environ Health Perspect*; DOI:10.1289/ehp.1408549

100. Vert C, et al. Effect of long-term exposure to air pollution on anxiety and depression in adults: A cross-sectional study. *Int J Hyg Environ Health*. 2017 Jul 3. pii: S1438-4639(17)30297-3. doi: 10.1016/j.ijheh.2017.06.009. [Epub ahead of print]
101. Lertxundi A, et al. Exposure to fine particle matter, nitrogen dioxide and benzene during pregnancy and cognitive and psychomotor developments in children at 15months of age. *Environ Int*. 2015 Apr 10;80:33-40. doi: 10.1016/j.envint.2015.03.007. [Epub ahead of print]
102. Wilker E, et al. Long-Term Exposure to Fine Particulate Matter, Residential Proximity to Major Roads and Measures of Brain Structure. doi: 10.1161/ STROKEAHA.114.008348. Published online before print April 23, 2015
103. Evens A, et al. The impact of low-level lead toxicity on school performance among children in the Chicago Public Schools: a population-based retrospective cohort study. *Environmental Health* 2015, 14:21
doi:10.1186/s12940-015-0008-9
104. Vishnevetsky J, et al. Combined effects of prenatal polycyclic aromatic hydrocarbons and material hardship on child IQ. *Neurotoxicology and Teratology*. doi: 10.1016/j.ntt.2015.04.002. Available online 23 April 2015
105. Talbott E, et al. Fine particulate matter and the risk of autism spectrum disorder. *Environmental Research*. Volume 140, July 2015, Pages 414–420
106. Kioumourtzoglou MA, Schwartz JD, Weisskopf MG, Melly SJ, Wang Y, Dominici F, Zanobetti A. Long-term PM_{2.5} Exposure and Neurological Hospital Admissions in the Northeastern United

States. Environ Health Perspect. 2015 May 15. [Epub ahead of print]

107. Calderón-Garcidueñas L, et al. Air Pollution and Children: Neural and Tight Junction Antibodies and Combustion Metals, the Role of Barrier Breakdown and Brain Immunity in Neurodegeneration. Journal of Alzheimer's Disease, August 2014 DOI: 10.3233/JAD-141365
108. Debes F, Weihe P, Grandjean P. Cognitive deficits at age 22 years associated with prenatal exposure to methylmercury. Cortex. 2015 Jun 4. pii: S0010-9452(15)00176-8. doi: 10.1016/j.cortex.2015.05.017. [Epub ahead of print]
109. Clark-Reyna SE, et al. Residential exposure to air toxics is linked to lower grade point averages among school children in El Paso, Texas, USA. Population and Environment. July 2015
110. Dickerson AS, et al. Autism spectrum disorder prevalence and proximity to industrial facilities releasing arsenic, lead or mercury. Sci Total Environ. 2015 Jul 25;536:245-251. doi: 10.1016/j.scitotenv.2015.07.024. [Epub ahead of print]
111. Jacobson JL, et al. Relation of Prenatal Methylmercury Exposure from Environmental Sources to Childhood IQ. Environ Health Perspect; DOI:10.1289/ehp. 1408554
112. Saenen N, et al. In Utero Fine Particle Air Pollution and Placental Expression of Genes in the Brain-Derived Neurotrophic Factor Signaling Pathway: An ENVIRONAGE Birth Cohort StudyEnviron Health Perspect; DOI:10.1289/ehp.1408549

113. Oudin A, et al. Traffic-Related Air Pollution and Dementia Incidence in Northern Sweden: A Longitudinal Study. *Environ Health Perspect*; DOI:10.1289/ehp.1408322
114. Forns J. et al. Traffic-Related Air Pollution, Noise at School, and Behavioral Problems in Barcelona Schoolchildren: A Cross-Sectional Study. *Environ Health Perspect*; DOI:10.1289/ehp.1409449
115. Suades-González E, Gascon M, Guxens M, Sunyer J. Air Pollution and Neuropsychological Development: A Review of the Latest Evidence. *Endocrinology*. 2015 Aug 4:en20151403. [Epub ahead of print]
116. Yorifuji T, Kashima S, Higa Diez M, Kado Y, Sanada S, Doi H. Prenatal Exposure to Traffic-related Air Pollution and Child Behavioral Development Milestone Delays in Japan. *Epidemiology*. 2015 Aug 5. [Epub ahead of print]
117. Pritchard C, Rosenorn-Lanng E. Neurological deaths of American adults (55–74) and the over 75's by sex compared with 20 Western countries 1989–2010: Cause for concern. *Surg Neurol Int* 23-Jul-2015;6:123
118. Weisskopf MG, Kioumourtzoglou MA, Roberts AL. Air Pollution and Autism Spectrum Disorders: Causal or Confounded? *Curr Environ Health Rep*. 2015 Sep 23. [Epub ahead of print]
119. Porta D, Narduzzi S, Badaloni C, Bucci S, Cesaroni G, Colelli V, Davoli M, Sunyer J, Zirro E, Schwartz J, Forastiere F. Air pollution and cognitive development at age seven in a prospective Italian birth cohort. *Epidemiology*. 2015 Sep 30. [Epub ahead of print]

120. Talbott EO, et al. Air toxics and the risk of autism spectrum disorder: the results of a population based case-control study in southwestern Pennsylvania. *Environ Health*. 2015 Oct 6;14:80. doi: 10.1186/s12940-015-0064-1.
121. Zanobetti A, et al. A national case-crossover analysis of the short-term effect of PM_{2.5} on hospitalizations and mortality in subjects with diabetes and neurological disorders. *Environmental Health* 2014, 13:38 doi:10.1186/1476-069X-13-38
122. Calderón-Garcidueñas L, Chao CK, Thompson C, Rodríguez-Díaz J, Franco-Lira M, et al. (2015) CSF Biomarkers: Low Amyloid-β1-42 and BDNF and High IFN γ Differentiate Children Exposed to Mexico City High Air Pollution V Controls. Alzheimer's Disease Uncertainties. *J Alzheimers Dis Parkinsonism* 5:189. doi: 10.4172/2161-0460.1000189
123. Costa LG, et al. NEUROTOXICITY OF TRAFFIC-RELATED AIR POLLUTION. *Neurotoxicology*. 2015 Nov 20. pii: S0161-813X(15)30024-3. doi: 10.1016/j.neuro.2015.11.008. [Epub ahead of print]
124. Laura A., et al. Effects of particulate matter exposure on multiple sclerosis hospital admission in Lombardy region, Italy. *Environ Res*. 2015 Nov 25;145:68-73. doi: 10.1016/j.envres.2015.11.017. [Epub ahead of print]
125. Cooper L, Eskenazi B, Romero C, Balmes J, Smith KR. Neurodevelopmental performance among school age children in rural Guatemala is associated with prenatal and postnatal exposure to carbon monoxide, a marker for exposure to woodsmoke. *Neurotoxicology*. 2012 Mar;33(2):246-54. doi: 10.1016/j.neuro.2011.09.004. Epub 2011 Sep 24.

126. Allen JL, et al. Developmental Neurotoxicity of Inhaled Ambient Ultrafine Particle Air Pollution: Parallels with Neuropathological and Behavioral Features of Autism and Other Neurodevelopmental Disorders. *Neurotoxicology*. 2015 Dec 22. pii: S0161-813X(15)30048-6. doi: 10.1016/j.neuro.2015.12.014. [Epub ahead of print]
127. Calderón-Garcidueñas L, et al. Air pollution, a rising environmental risk factor for cognition, neuroinflammation and neurodegeneration: The clinical impact on children and beyond. *Rev Neurol (Paris)*. 2015 Dec 21. pii: S0035-3787(15)00923-6. doi: 10.1016/j.neurol.2015.10.008. [Epub ahead of print]
128. Marquesa R, et al. Neurodevelopment of Amazonian children exposed to methylmercury (from Thimerosal in vaccines) and methylmercury (from fish). *Environmental Research Available online* 7 January 2016
129. Chen JC, et al. Ambient Air Pollution and Neurotoxicity on Brain Structure: Evidence From Women's Health Initiative Memory Study. *ANN NEUROL* 2015;78:466–476
130. Best EA, Juarez-Colunga E, James K, LeBlanc WG, Serdar B. Biomarkers of Exposure to Polycyclic Aromatic Hydrocarbons and Cognitive Function among Elderly in the United States (National Health and Nutrition Examination Survey: 2001-2002). *PLoS One*. 2016 Feb 5;11(2):e0147632. doi: 10.1371/journal.pone.0147632.
131. Mumaw CL, et al. Microglial priming through the lung-brain axis: the role of air pollution-induced circulating factors. *FASEB J*. 2016 Feb 10. pii: fj.201500047. [Epub ahead of print]

132. Jung CR, Lin YT, Hwang BF. Ozone, particulate matter, and newly diagnosed Alzheimer's disease: a population-based cohort study in Taiwan. *J Alzheimers Dis.* 2015;44(2):573-84. doi: 10.3233/JAD-140855.
133. Oudin, A, et al. Traffic-Related Air Pollution and Dementia Incidence in Northern Sweden: A Longitudinal Study. *Environ Health Perspect*; DOI:10.1289/ehp.1408322
134. Margolis AE, et al. Longitudinal effects of prenatal exposure to air pollutants on self-regulatory capacities and social competence. *J Child Psychol Psychiatry*. 2016 Mar 17. doi: 10.1111/jcpp.12548. [Epub ahead of print]
135. Clark-Reyna SE, et al. Residential exposure to air toxics is linked to lower grade point averages among school children in El Paso, Texas, USA. *Popul Environ*. 2016 Mar;37(3):319-340. Epub 2015 Jul 17.
136. Kim KN, et al. Long-Term Fine Particulate Matter Exposure and Major Depressive Disorder in a Community-Based Urban Cohort. *Environ Health Perspect*. 2016 Apr 29. [Epub ahead of print]
137. Basagaña X, et al. Neurodevelopmental Deceleration by Urban Fine Particles from Different Emission Sources: A Longitudinal Observational Study. *Environ Health Perspect*. 2016 Apr 29;124(5). [Epub ahead of print]
138. Huang F, et al. Particulate Matter and Hospital Admissions for Stroke in Beijing, China: Modification Effects by Ambient Temperature. *J Am Heart Assoc.* 2016 Jul 13;5(7). pii: e003437. doi: 10.1161/JAHA.116.003437.

139. Han M, et al. Association between hemorrhagic stroke occurrence and meteorological factors and pollutants. *BMC Neurol.* 2016 May 4;16(1):59. doi: 10.1186/s12883-016-0579-2.
140. Ajmani GS, et al. Effects of Ambient Air Pollution Exposure on Olfaction: A Review. *Environ Health Perspect.* 2016 Jun 10. [Epub ahead of print]
141. Zhang C, et al. Role of astrocyte activation in fine particulate matter-enhancement of existing ischemic stroke in Sprague-Dawley male rats. *J Toxicol Environ Health A.* 2016;79(9-10):393-401. doi: 10.1080/15287394.2016.1176615.
142. Colicino E, et al. Telomere Length, Long-Term Black Carbon Exposure, and Cognitive Function in a Cohort of Older Men: The VA Normative Aging Study. *Environ Health Perspect.* 2016 Jun 3. [Epub ahead of print]
143. Oudin, A., Bråbäck, L., Oudin Åström, D., Strömgren, M., Forsberg, B.: Association between neighbourhood air pollution concentrations and dispensed medication for psychiatric disorders in a large longitudinal cohort of Swedish children and adolescents. *BMJ Open* 2016;6:e010004
doi:10.1136/bmjopen-2015-010004
144. Maher, B, et al. Magnetite pollution nanoparticles in the human brain. *PNAS* 2016 ; published ahead of print September 6, 2016, doi:10.1073/pnas.1605941113
145. Tzivian L, et al. Long-Term Air Pollution and Traffic Noise Exposures and Mild Cognitive Impairment in Older Adults: A Cross-Sectional Analysis of the Heinz Nixdorf Recall Study. *Environ Health Perspect;* DOI:10.1289/ehp.1509824

146. Flores-Pajot MC, Ofner M, Do MT, Lavigne E, Villeneuve PJ. Childhood autism spectrum disorders and exposure to nitrogen dioxide, and particulate matter air pollution: A review and meta-analysis. *Environ Res.* 2016 Aug 25. pii: S0013-9351(16)30317-6. doi: 10.1016/j.envres.2016.07.030. [Epub ahead of print]
147. Basagaña X, et al. Neurodevelopmental Deceleration by Urban Fine Particles from Different Emission Sources: A Longitudinal Observational Study. *Environ Health Perspect*; DOI:10.1289/EHP209
148. Cheng H, et al. Nanoscale Particulate Matter from Urban Traffic Rapidly Induces Oxidative Stress and Inflammation in Olfactory Epithelium with Concomitant Effects on Brain. *Environ Health Perspect*; DOI:10.1289/EHP134
149. Lam J, Sutton P, Kalkbrenner A, Windham G, Halladay A, Koutras E, Lawler C, Davidson L, Daniels N, Newschaffer C, Woodruff T. A Systematic Review and Meta-Analysis of Multiple Airborne Pollutants and Autism Spectrum Disorder. *PLoS One.* 2016 Sep 21;11(9):e0161851. doi: 10.1371/journal.pone.0161851.
150. Brockmeyer S, D'Angiulli A. How air pollution alters brain development: the role of neuroinflammation. *Transl Neurosci.* 2016 Mar 21;7(1):24-30. doi: 10.1515/tnsci-2016-0005. eCollection 2016.
151. Chen H, et al. Living near major roads and the incidence of dementia, Parkinson's disease, and multiple sclerosis: a population-based cohort study. *Lancet.* 2017 Feb 18;389(10070):718-726. doi: 10.1016/S0140-6736(16)32399-6. Epub 2017 Jan 5.

152. Cacciottolo M, et al. Particulate air pollutants, APOE alleles and their contributions to cognitive impairment in older women and to amyloidogenesis in experimental models. *Translational Psychiatry* (2017) 7, e1022; doi:10.1038/tp.2016.280 Published online 31 January 2017
153. Stingone JA, McVeigh KH, Claudio L. Early-life exposure to air pollution and greater use of academic support services in childhood: a population-based cohort study of urban children. *Environ Health.* 2017 Jan 18;16(1):2. doi: 10.1186/s12940-017-0210-z.
154. Pun VC, et al. Association of Ambient Air Pollution with Depressive and Anxiety Symptoms in Older Adults: Results from the NSHAP Study. *Environ Health Perspect;* DOI:10.1289/EHP494
155. Lee H, Myung W, Kim DK, Kim SE, Kim CT, Kim H. Short-term air pollution exposure aggravates Parkinson's disease in a population-based cohort. *Sci Rep.* 2017 Mar 16;7:44741. doi: 10.1038/srep44741.
156. Kim D, et al. The joint effect of air pollution exposure and copy number variation on risk for autism. *Autism Res.* 2017 Apr 27. doi: 10.1002/aur.1799. [Epub ahead of print]
157. Jayaraj RL, et al. Outdoor Ambient Air Pollution and Neurodegenerative Diseases: the Neuroinflammation Hypothesis. *Curr Environ Health Rep.* 2017 Apr 25. doi: 10.1007/s40572-017-0142-3. [Epub ahead of print]
158. de Water E, Proal E, Wang V, Meina SM, Schnaas L, Téllez-Rojo MM, Wright RO, Tang CY, Horton MK. Prenatal Manganese Exposure and Intrinsic Functional Connectivity of

Emotional Brain Areas in Children. *Neurotoxicology*. 2017 Jun 10. pii: S0161-813X(17)30102-X. doi: 10.1016/j.neuro.2017.06.006. [Epub ahead of print]

159. Dokyoon Kim D. et al. The joint effect of air pollution exposure and copy number variation on risk for autism. *Autism Research*, 2017; DOI: 10.1002/aur.1799

160. González-Maciel A, Reynoso-Robles R, Torres-Jardón R, Mukherjee PS, Calderón-Garcidueñas L. Combustion-Derived Nanoparticles in Key Brain Target Cells and Organelles in Young Urbanites: Culprit Hidden in Plain Sight in Alzheimer's Disease Development. *J Alzheimers Dis*. 2017 Jun 3. doi: 10.3233/JAD-170012. [Epub ahead of print]

161. Lin H, et al. Exposure to air pollution and tobacco smoking and their combined effects on depression in six low- and middle-income countries. *Br J Psychiatry*. 2017 Aug 10. pii: bjp.bp.117.202325. doi: 10.1192/bjp.bp.117.202325. [Epub ahead of print]

162. Forns J, et al. Longitudinal association between air pollution exposure at school and cognitive development in school children over a period of 3.5 years. *Environ Res*. 2017 Aug 28;159:416-421. doi: 10.1016/j.envres.2017.08.031. [Epub ahead of print]

163. Hullmann M, et al. Diesel engine exhaust accelerates plaque formation in a mouse model of Alzheimer's disease. *Part Fibre Toxicol*. 2017 Aug 30;14(1):35. doi: 10.1186/s12989-017-0213-5.

164. Chen H, et al. Exposure to ambient air pollution and the incidence of dementia: A population-based cohort study.

Environment International. Volume 108, November 2017, Pages 271-277

165. van der Kooi A, et al. Long-Term Air Pollution Exposure and Amyotrophic Lateral Sclerosis in Netherlands: A Population-based Case-control Study. Environ Health Perspect; DOI:10.1289/EHP1115
166. Alvarez-Pedrerol M, et al. Impact of commuting exposure to traffic-related air pollution on cognitive development in children walking to school. Environmental Pollution, 2017; 231: 837 DOI: 10.1016/j.envpol.2017.08.075
167. Raz R, et al. Traffic Related Air Pollution and Autism Spectrum Disorder: A Population Based Nested Case-Control Study in Israel. Am J Epidemiol. 2017 Aug 17. doi: 10.1093/aje/kwx294. [Epub ahead of print]
168. Guo P, et al. Ambient Air Pollution and Risk for Ischemic Stroke: A Short-Term Exposure Assessment in South China. Int J Environ Res Public Health. 2017 Sep 20;14(9). pii: E1091. doi: 10.3390/ijerph14091091.
169. Younan D, et al. Longitudinal Analysis of Particulate Air Pollutants and Adolescent Delinquent Behavior in Southern California. Journal of Abnormal Child Psychology, 2017; DOI: 10.1007/s10802-017-0367-5
170. Sunyer J, et al. Traffic-related Air Pollution and Attention in Primary School Children: Short-term Association. Epidemiology: March 2017 - Volume 28 - Issue 2 - p 181–189. doi: 10.1097/EDE.0000000000000603

171. Li K, et al. Early postnatal exposure to airborne fine particulate matter induces autism-like phenotypes in male rats. *Toxicol Sci.* 2017 Nov 7. doi: 10.1093/toxsci/kfx240. [Epub ahead of print]
172. Hanamsagar R, et al. Environment matters: microglia function and dysfunction in a changing world. *Curr Opin Neurobiol.* 2017 Oct 30;47:146-155. doi: 10.1016/j.conb.2017.10.007. [Epub ahead of print]
173. Sass V, et al. The effects of air pollution on individual psychological distress. *Health & Place*, 2017; 48: 72 DOI: 10.1016/j.healthplace.2017.09.006
174. Lett LA, et al. The Combined Influence of Air Pollution and Home Learning Environment on Early Cognitive Skills in Children. *Int J Environ Res Public Health.* 2017 Oct 26;14(11). pii: E1295. doi: 10.3390/ijerph14111295.
175. Suwannasual U, et al. Exposure to traffic-generated air pollutants mediates alterations in brain microvascular integrity in wildtype mice on a high-fat diet. *Environ Res.* 2017 Oct 23;160:449-461. doi: 10.1016/j.envres.2017.10.029. [Epub ahead of print]
176. Goodrich AJ, et al. Joint effects of prenatal air pollutant exposure and maternal folic acid supplementation on risk of autism spectrum disorder. *Autism Res.* 2017 Nov 9. doi: 10.1002/aur.1885. [Epub ahead of print]
177. Casas L, et al. Does air pollution trigger suicide? A case-crossover analysis of suicide deaths over the life span. *European Journal of Epidemiology.* November 2017, Volume 32, Issue 11, pp 973–981

178. Oudin A, et al. The association between daily concentrations of air pollution and visits to a psychiatric emergency unit: a case-crossover study. *Environ Health*. 2018 Jan 10;17(1):4. doi: 10.1186/s12940-017-0348-8.
179. Jia Z, et al. Exposure to Ambient Air Particles Increases the Risk of Mental Disorder: Findings from a Natural Experiment in Beijing. *Int J Environ Res Public Health*. 2018 Jan 19;15(1). pii: E160. doi: 10.3390/ijerph15010160.
180. Kern JK, et al. Developmental neurotoxicants and the vulnerable male brain: a systematic review of suspected neurotoxicants that disproportionately affect males. *Acta Neurobiol Exp (Wars)*. 2017;77(4):269-296.
181. Calderón-Garcidueñas L, et al. Hallmarks of Alzheimer disease are evolving relentlessly in Metropolitan Mexico City infants, children and young adults. APOE4 carriers have higher suicide risk and higher odds of reaching NFT stage V at ≤ 40 years of age. *Environmental Research*, 2018; 164: 475 DOI: 10.1016/j.envres.2018.03.023
182. Kalkbrenner A, et al. Air Toxics in Relation to Autism Diagnosis, Phenotype, and Severity in a U.S. Family-Based Study. *Environ Health Perspect*; DOI:10.1289/EHP1867
183. Friedrich MJ, et al. Air Pollutants Undermine Infant Brain Development. *JAMA*. 2018 Feb 20;319(7):648. doi: 10.1001/jama.2018.0966.
184. Power MC, et al. The Association of Long-Term Exposure to Particulate Matter Air Pollution with Brain MRI Findings: The ARIC Study. *Environ Health Perspect*. 2018 Feb 16;126(2):027009. doi: 10.1289/EHP2152.

185. Lu J, et al. Polluted Morality: Air Pollution Predicts Criminal Activity and Unethical Behavior. *Psychological Science*, 2018; 095679761773580 DOI: 10.1177/0956797617735807
186. Jeanjean M, Bind MA, Roux J, Ongagna JC, de Sèze J, Bard D, Leray E. Ozone, NO₂ and PM₁₀ are associated with the occurrence of multiple sclerosis relapses. Evidence from seasonal multi-pollutant analyses. *Environ Res.* 2018 Feb 6;163:43-52. doi: 10.1016/j.envres.2018.01.040. [Epub ahead of print] PMID: 29426027 [PubMed - as supplied by publisher]
187. Wang P, et al. (2017) Socioeconomic disparities and sexual dimorphism in neurotoxic effects of ambient fine particles on youth IQ: A longitudinal analysis. *PLoS ONE* 12(12): e0188731. <https://doi.org/10.1371/journal.pone.0188731>
188. Hüls A, et al. The role of air pollution and lung function in cognitive impairment. *Eur Respir J.* 2018 Feb 21;51(2). pii: 1701963. doi: 10.1183/13993003.01963-2017. Print 2018 Feb.
189. Gonzalez-Casanova I, et al. Prenatal exposure to environmental pollutants and child development trajectories through 7 years. *Int J Hyg Environ Health.* 2018 Apr 22. pii: S1438-4639(17)30761-7. doi: 10.1016/j.ijheh.2018.04.004. [Epub ahead of print]
190. Duan J, et al. Is the serious ambient air pollution associated with increased admissions for schizophrenia? *Sci Total Environ.* 2018 Jul 2;644:14-19. doi: 10.1016/j.scitotenv.2018.06.218. [Epub ahead of print]
191. Szyszkowicz M, et al. Ambient air pollution exposure and emergency department visits for substance abuse. *PLoS One.*

2018 Jun 29;13(6):e0199826. doi: 10.1371/journal.pone.0199826. eCollection 2018.

192. Buoli M, et al. Is there a link between air pollution and mental disorders? *Environ Int*. 2018 Jun 4;118:154-168. doi: 10.1016/j.envint.2018.05.044. [Epub ahead of print]
193. Gonzalez-Casanova I, et al. Prenatal exposure to environmental pollutants and child development trajectories through 7 years. *Int J Hyg Environ Health*. 2018 Apr 22. pii: S1438-4639(17)30761-7. doi: 10.1016/j.ijheh.2018.04.004. [Epub ahead of print]
194. Béjot Y, et al. A review of epidemiological research on stroke and dementia and exposure to air pollution. *Int J Stroke*. 2018 Jan 1:1747493018772800. doi: 10.1177/1747493018772800. [Epub ahead of print]
195. Povedano M, et al. Spatial Assessment of the Association between Long-Term Exposure to Environmental Factors and the Occurrence of Amyotrophic Lateral Sclerosis in Catalonia, Spain: A Population-Based Nested Case-Control Study. *Neuroepidemiology*. 2018 May 31;51(1-2):33-49. doi: 10.1159/000489664. [Epub ahead of print]
196. Liu W, et al. Air pollution associated with non-suicidal self-injury in Chinese adolescent students: A cross-sectional study. *Chemosphere*. 2018 Oct;209:944-949. doi: 10.1016/j.chemosphere.2018.06.168. Epub 2018 Jun 28.
197. Peng C, et al. Residential Proximity to Major Roadways at Birth, DNA Methylation at Birth and Midchildhood, and Childhood Cognitive Test Scores: Project Viva(Massachusetts, USA)

Published: 18 September 2018, DOI:
<https://doi.org/10.1289/EHP2034>

198. Yolton K, et al. Lifetime exposure to traffic-related air pollution and symptoms of depression and anxiety at age 12 years. *Environ Res.* 2019 Mar 2;173:199-206. doi: 10.1016/j.envres.2019.03.005. [Epub ahead of print]
199. Ehsanifar M, et al. Prenatal exposure to diesel exhaust particles causes anxiety, spatial memory disorders with alters expression of hippocampal pro-inflammatory cytokines and NMDA receptor subunits in adult male mice offspring. *Ecotoxicol Environ Saf.* 2019 Mar 25;176:34-41. doi: 10.1016/j.ecoenv.2019.03.090. [Epub ahead of print]
200. Pelch KE, et al. Environmental Chemicals and Autism: A Scoping Review of the Human and Animal Research. *Environ Health Perspect.* 2019 Apr;127(4):46001. doi: 10.1289/EHP4386.
201. Rivas I, et al. Association between Early Life Exposure to Air Pollution and Working Memory and Attention. *Environ Health Perspect.* 2019 May;127(5):57002. doi: 10.1289/EHP3169.
202. Ji Y, et al. Is air pollution a potential cause of neuronal injury? *Neurol Res.* 2019 May 17:1-7. doi: 10.1080/01616412.2019.1609170. [Epub ahead of print]
203. Hedges DW, et al. Association between Exposure to Air Pollution and Hippocampal Volume in Adults in the UK Biobank. *Neurotoxicology.* 2019 Jun 17. pii: S0161-813X(19)30053-1. doi: 10.1016/j.neuro.2019.06.005. [Epub ahead of print]
204. Zhang Z, et al. Long-Term Particulate Matter Exposure and Onset of Depression in Middle-Aged Men and Women. *Environ*

Health Perspect. 2019 Jul;127(7):77001. doi: 10.1289/EHP4094. Epub 2019 Jul 3.

205. Calderón-Garcidueñas L, et al. Combustion and friction-derived nanoparticles and industrial-sourced nanoparticles: The culprit of Alzheimer and Parkinson's diseases. Environ Res. 2019 Jul 5;176:108574. doi: 10.1016/j.envres.2019.108574. [Epub ahead of print]
206. Yang CY, et al. Does ambient ozone air pollution trigger suicide attempts? A case cross-over analysis in Taipei. J Toxicol Environ Health A. 2019 Jul 12:1-7. doi: 10.1080/15287394.2019.1640980. [Epub ahead of print].
207. Fang XY, et al. Association between prenatal exposure to household inhalants exposure and ADHD-like behaviors at around 3 years of age: Findings from Shenzhen Longhua Child Cohort Study. Environ Res. 2019 Jul 26;177:108612. doi: 10.1016/j.envres.2019.108612. [Epub ahead of print]
208. Khan A, et al. Environmental pollution is associated with increased risk of psychiatric disorders in the US and Denmark. PLoS Biol. 2019 Aug 20;17(8):e3000353. doi: 10.1371/journal.pbio.3000353. eCollection 2019 Aug.
209. Wu Q, et al. Air pollution, stock returns, and trading activities in China. Pacific-Basin Finance Journal. Volume 51, October 2018, Pages 342-365
210. Kim SY, et al. Neuronal and perineuronal changes of cerebral cortex after exposure to inhaled particulate matter. Sci Rep. 2019 Dec 19;9(1):19421. doi: 10.1038/s41598-019-55956-4.

211. Grineski S, et al. Hazardous air pollutants are associated with worse performance in reading, math, and science among US primary schoolchildren. *Environ Res.* 2019 Nov 15:108925. doi: 10.1016/j.envres.2019.108925. [Epub ahead of print]
212. Bernardini F, et al. Air pollutants and daily number of admissions to psychiatric emergency services: evidence for detrimental mental health effects of ozone. *Epidemiol Psychiatr Sci.* 2019 Nov 6:1-7. doi: 10.1017/S2045796019000623. [Epub ahead of print] PMID: 31690359 [PubMed - as supplied by publisher]
213. Younan D, et al. Particulate matter and episodic memory decline mediated by early neuroanatomic biomarkers of Alzheimer's disease. *Brain*, awz348, <https://doi.org/10.1093/brain/awz348>. Published: 20 November 2019
214. Burkhardt J, et al. The effect of pollution on crime: Evidence from data on particulate matter and ozone. *Journal of Environmental Economics and Management*, 2019; 102267 DOI: 10.1016/j.jeem.2019.102267
215. Brunst KJ, et al. Myo-inositol mediates the effects of traffic-related air pollution on generalized anxiety symptoms at age 12 years. *Environ Res.* 2019 Aug;175:71-78. doi: 10.1016/j.envres.2019.05.009. Epub 2019 May 11.
216. Brokamp C, et al. Psychiatric Emergency Department Utilization and Fine Particulate Matter: A Case-Crossover Study. *Environ Health Perspect.* 2019 Sep;127(9):97006. doi: 10.1289/EHP4815. Epub 2019 Sep 25. PMID: 31553231 [PubMed - in process] Free Article

217. Costa LG,, et al. Developmental impact of air pollution on brain function. *Neurochem Int.* 2019 Oct 15:104580. doi: 10.1016/j.neuint.2019.104580. [Epub ahead of print]
218. Jo H, et al. Sex-specific associations of autism spectrum disorder with residential air pollution exposure in a large Southern California pregnancy cohort. *Environ Pollut.* 2019 Nov;254(Pt A):113010. doi: 10.1016/j.envpol.2019.113010. Epub 2019 Aug 5.
219. Mortamais M, et al. Effects of prenatal exposure to particulate matter air pollution on corpus callosum and behavioral problems in children. *Environ Res.* 2019 Sep 7;178:108734. doi: 10.1016/j.envres.2019.108734. [Epub ahead of print]
220. Vivanco-Hidalgo RM, et al. Association of residential air pollution, noise, and greenspace with initial ischemic stroke severity. *Environ Res.* 2019 Sep 5;179(Pt A):108725. doi: 10.1016/j.envres.2019.108725. [Epub ahead of print]
221. Salm AK, et al. Increased Dementia Mortality in West Virginia Counties with Mountaintop Removal Mining? *Int J Environ Res Public Health.* 2019 Nov 4;16(21). pii: E4278. doi: 10.3390/ijerph16214278. PMID: 31689936 [PubMed - in process]
222. Costa LG, et al. Effects of air pollution on the nervous system and its possible role in neurodevelopmental and neurodegenerative disorders. *Pharmacol Ther.* 2020 Mar 9:107523. doi: 10.1016/j.pharmthera.2020.107523. [Epub ahead of print]
223. Petkus AJ, et al. Exposure to fine particulate matter and temporal dynamics of episodic memory and depressive symptoms in older women. *Environ Int.* 2019 Dec

24;135:105196. doi: 10.1016/j.envint.2019.105196. [Epub ahead of print]

224. Wang Z, et al. Association between short-term exposure to air pollution and ischemic stroke onset: a time-stratified case-crossover analysis using a distributed lag nonlinear model in Shenzhen, China. *Environ Health*. 2020 Jan 2;19(1):1. doi: 10.1186/s12940-019-0557-4.

225. Wang Z, et al. Association between short-term exposure to air pollution and ischemic stroke onset: a time-stratified case-crossover analysis using a distributed lag nonlinear model in Shenzhen, China. *Environ Health*. 2020 Jan 2;19(1):1. doi: 10.1186/s12940-019-0557-4.

226. Boda E, et al. Understanding the effects of air pollution on neurogenesis and gliogenesis in the growing and adult brain. *Curr Opin Pharmacol*. 2019 Dec 30;50:61-66. doi: 10.1016/j.coph.2019.12.003. [Epub ahead of print]

227. Horsdal H, et al. Association of Childhood Exposure to Nitrogen Dioxide and Polygenic Risk Score for Schizophrenia With the Risk of Developing Schizophrenia. *JAMA Network Open*, 2019; 2 (11): e1914401 DOI: 10.1001/jamanetworkopen.2019.14401

228. Kim H, et al. Gender Difference in the Effects of Outdoor Air Pollution on Cognitive Function Among Elderly in Korea. *Front Public Health*. 2019 Dec 10;7:375. doi: 10.3389/fpubh.2019.00375. eCollection 2019.

229. Wang R, et al. Residential greenness, air pollution and psychological well-being among urban residents in Guangzhou,

China. Sci Total Environ. 2020 Apr 1;711:134843. doi: 10.1016/j.scitotenv.2019.134843. Epub 2019 Nov 18.

230. Pagliaccio D, et al. Prenatal exposure to polycyclic aromatic hydrocarbons modifies the effects of early life stress on attention and Thought Problems in late childhood. Journal of Child Psychology and Psychiatry, 2020; DOI: 10.1111/jcpp.13189

231. Beckwith T, et al. Reduced gray matter volume and cortical thickness associated with traffic-related air pollution in a longitudinally studied pediatric cohort. PLOS ONE, 2020; 15 (1): e0228092 DOI: 10.1371/journal.pone.0228092

232. Yuchi W, et al. Road proximity, air pollution, noise, green space and neurologic disease incidence: a population-based cohort study. Environmental Health, 2020; 19 (1) DOI: 10.1186/s12940-020-0565-4

233. Chew S, et al. Impairment of mitochondrial function by particulate matter: Implications for the brain. Neurochem Int. 2020 Feb 10:104694. doi: 10.1016/j.neuint.2020.104694. [Epub ahead of print]

234. Grande G, et al. Association Between Cardiovascular Disease and Long-term Exposure to Air Pollution With the Risk of Dementia. JAMA Neurology, 2020; DOI: 10.1001/jamaneurol.2019.4914

235. Jo H, et al. Sex-specific associations of autism spectrum disorder with residential air pollution exposure in a large Southern California pregnancy cohort. Environmental Pollution, Volume 254, Part A, November 2019, 113010

236. Shang L, et al. Effects of prenatal exposure to NO₂ on children's neurodevelopment: a systematic review and meta-analysis. *Environ Sci Pollut Res Int.* 2020 Apr 30. doi: 10.1007/s11356-020-08832-y. [Epub ahead of print]
237. Yu X, et al. Exposure to air pollution and cognitive impairment risk: a meta-analysis of longitudinal cohort studies with dose-response analysis. *J Glob Health.* 2020 Jun;10(1):010417. doi: 10.7189/jogh.10.010417.
238. Mullen C, et al. Effects of PM2.5 on Third Grade Students' Proficiency in Math and English Language Arts. *Int. J. Environ. Res. Public Health* 2020, 17(18), 6931; <https://doi.org/10.3390/ijerph17186931>
239. Lu P, Zhang Y, Xia G, Zhang W, Xu R, Wang C, Guo Y, Li S. Attributable risks associated with hospital outpatient visits for mental disorders due to air pollution: A multi-city study in China. *Environ Int.* 2020 Jun 30;143:105906. doi: 10.1016/j.envint.2020.105906. [Epub ahead of print]
240. Lu P, et al. Attributable risks associated with hospital outpatient visits for mental disorders due to air pollution: A multi-city study in China. *Environ Int.* 2020 Jun 30;143:105906. doi: 10.1016/j.envint.2020.105906. [Epub ahead of print]
241. Zhao T, et al. Depression and Anxiety With Exposure to Ozone and Particulate Matter: An Epidemiological Claims Data Analysis. *J Hyg Environ Health.* 2020 May 19;228:113562. doi: 10.1016/j.ijheh.2020.113562. Online ahead of print.
242. Bronstein J, et al. Diesel exhaust extract exposure induces neuronal toxicity by disrupting autophagy. *Toxicological Sciences*, 2020; DOI: 10.1093/toxsci/kfaa055

243. Patten K, et al. Effects of early life exposure to traffic-related air pollution on brain development in juvenile Sprague-Dawley rats. *Translational Psychiatry*, 2020; 10 (1) DOI: 10.1038/s41398-020-0845-3
244. Calderó n-Garciduen~L, et al. Quadruple abnormal protein aggregates in brainstem pathology and exogenous metal-rich magnetic nanoparticles (and engineered Ti-rich nanorods). The substantia nigrae is a very early target in young urbanites and the gastrointestinal tract a key brainstem portal. *Environmental Research* 191 (2020) 110139
245. Iaccarino L, et al. Association Between Ambient Air Pollution and Amyloid Positron Emission Tomography Positivity in Older Adults With Cognitive Impairment. *JAMA Neurol.* Published online November 30, 2020.
doi:10.1001/jamaneurol.2020.3962
246. Patten K, et al. The Effects of Chronic Exposure to Ambient Traffic-Related Air Pollution on Alzheimer's Disease Phenotypes in Wildtype and Genetically Predisposed Male and Female Rats. *Environmental Health Perspectives*, 2021; 129 (5) DOI: 10.1289/EHP8905
247. Jo S, Kim Y, Park KW, et al. Association of NO₂ and Other Air Pollution Exposures With the Risk of Parkinson Disease. *JAMA Neurol.* Published online May 17, 2021.
doi:10.1001/jamaneurol.2021.1335
248. Gao X, et al. Short-term air pollution, cognitive performance and nonsteroidal anti-inflammatory drug use in the Veterans Affairs Normative Aging Study. *Nature Aging*, 2021; DOI: 10.1038/s43587-021-00060-4

249. Reuben A, et al. Association Of Air Pollution Exposure in Childhood and Adolescence With Psychopathology at the Transition To Adulthood. *JAMA Network Open*, 2021 DOI: 10.1001/jamanetworkopen.2021.7508
250. Margolis A, et al. Prenatal exposure to air pollution is associated with childhood inhibitory control and adolescent academic achievement. *Environmental Research*, 2021; 111570 DOI: 10.1016/j.envres.2021.111570
251. Shaffer R, et al. Fine Particulate Matter and Dementia Incidence in the Adult Changes in Thought Study. *Environmental Health Perspectives*, 2021; 129 (8): 087001 DOI: 10.1289/EHP9018
253. Jose Guillermo Cedeño Laurent, Piers MacNaughton, Emily Jones, Anna S Young, Maya Bliss, Skye Flanigan, Jose Vallarino, Ling Jyh Chen, Xiaodong Cao, Joseph G Allen. Associations between acute exposures to PM_{2.5} and carbon dioxide indoors and cognitive function in office workers: a multicountry longitudinal prospective observational study. *Environmental Research Letters*, 2021; 16 (9): 094047 DOI: 10.1088/1748-9326/ac1bd8
254. Herrnstadt, Evan, Anthony Heyes, Erich Muehlegger, and Soodeh Saberian. 2021. "Air Pollution and Criminal Activity: Microgeographic Evidence from Chicago." *American Economic Journal: Applied Economics*, 13 (4): 70-100. DOI: 10.1257/app.20190091
255. Melissa A. Furlong, Gene E. Alexander, Yann C. Klimentidis, David A. Raichlen. Association of Air Pollution and Physical Activity With Brain Volumes. *Neurology*, 2021;

10.1212/WNL.0000000000013031 DOI:

10.1212/WNL.0000000000013031

256. Alemany S, et al. Associations between air pollution and biomarkers of Alzheimer's disease in cognitively unimpaired individuals. *Environment International*, 2021; 157: 106864 DOI: 10.1016/j.envint.2021.106864

257. Wang X, et al. Association of improved air quality with lower dementia risk in older women *Proceedings of the National Academy of Sciences* Jan 2022, 119 (2) e2107833119; DOI: 10.1073/pnas.2107833119

258. Ehsanifar M, Yavari Z, Rafati M. Exposure to urban air pollution particulate matter: neurobehavioral alteration and hippocampal inflammation. *Environ Sci Pollut Res Int.* 2022 Mar 3. doi: 10.1007/s11356-022-19367-9. Epub ahead of print. PMID: 35237914.

259. Wei S, Xu T, Jiang T, Yin D. Chemosensory Dysfunction Induced by Environmental Pollutants and Its Potential As a Novel Neurotoxicological Indicator: A Review. *Environ Sci Technol.* 2021 Aug 17;55(16):10911-10922. doi: 10.1021/acs.est.1c02048. Epub 2021 Aug 6. PMID: 34355568.

260. Seifi M, Yunesian M, Naddafi K, Nabizadeh R, Dobaradaran S, Ziyarati MT, Nazmara S, Yekaninejad MS, Mahvi AH. Exposure to ambient air pollution and socio-economic status on intelligence quotient among schoolchildren in a developing country. *Environ Sci Pollut Res Int.* 2021 Aug 6. doi: 10.1007/s11356-021-15827-w. Epub ahead of print. PMID: 34355328.

261. Ailshire J, Crimmins E. Fine particulate matter air pollution and cognitive function among older US adults *Am J Epidemiol.* 2014 Aug 15;180(4):359-66. doi: 10.1093/aje/kwu155. Epub 2014 Jun 24.
262. Gatzke-Kopp LM, Warkentien S, Willoughby M, Fowler C, Folch DC, Blair C. Proximity to sources of airborne lead is associated with reductions in Children's executive function in the first four years of life. *Health Place.* 2021 Feb 2;68:102517. doi: 10.1016/j.healthplace.2021.102517
263. Rhew SH, Kravchenko J, Lyerly HK. Exposure to low-dose ambient fine particulate matter PM2.5 and Alzheimer's disease, non-Alzheimer's dementia, and Parkinson's disease in North Carolina. *PLoS One.* 2021;16(7):e0253253. Published 2021 Jul 9. doi:10.1371/journal.pone.0253253
264. Kim BY, Park JY, Cho KJ, Bae JH. Effects of Urban Particulate Matter on the Olfactory System in a Mouse Model. *Am J Rhinol Allergy.* 2021 Jul 8:19458924211026416. doi: 10.1177/19458924211026416. Epub ahead of print. PMID: 34236242.
265. Younan D, Wang X, Millstein J, Petkus AJ, Beavers DP, Espeland MA, Chui HC, Resnick SM, Gatz M, Kaufman JD, Wellenius GA, Whitsel EA, Manson JE, Rapp SR, Chen JC. Air quality improvement and cognitive decline in community-dwelling older women in the United States: A longitudinal cohort study. *PLoS Med.* 2022 Feb 3;19(2):e1003893. doi: 10.1371/journal.pmed.1003893. eCollection 2022 Feb. PMID: 35113870
266. Letellier N, et al. Air quality improvement and incident dementia: Effects of observed and hypothetical reductions in air

pollutant using parametric g-computation. *Alzheimers Dement*. 2022 Feb 9. doi: 10.1002/alz.12606

267. Duchesne J, et al. Exposure to ambient air pollution and cognitive decline: Results of the prospective Three-City cohort study. *Environ Int*. 2022 Feb 3;161:107118. doi: 10.1016/j.envint.2022.107118

268. Liu R, DeSerisy M, Fox NA, Herbstman JB, Rauh VA, Beebe B, Margolis AE. Prenatal exposure to air pollution and maternal stress predict infant individual differences in reactivity and regulation and socioemotional development. *J Child Psychol Psychiatry*. 2022 Feb 17. doi: 10.1111/jcpp.13581

269. Ehsanifar M, Yavari Z, Rafati M. Exposure to urban air pollution particulate matter: neurobehavioral alteration and hippocampal inflammation. *Environ Sci Pollut Res Int*. 2022 Mar 3. doi: 10.1007/s11356-022-19367-9

270. Castagna A, Mascheron E, Fustinon S, Montiross R. Air pollution and neurodevelopmental skills in preschool- and school-aged children: A systematic review. *Neurosci Biobehav Rev*. 2022 Mar 21:104623. doi: 10.1016/j.neubiorev.2022.104623

271. Laurent JGC, MacNaughton P, Jones E, Young AS, Bliss M, Flanigan S, Vallarino J, Chen LJ, Cao X, Allen JG. Associations between Acute Exposures to PM_{2.5} and Carbon Dioxide Indoors and Cognitive Function in Office Workers: A Multicountry Longitudinal Prospective Observational Study.

272. Chen Z, et al. Ambient air pollution and epileptic seizures: a panel study in Australia. *Epilepsia*. 2022 Apr 8. doi: 10.1111/epi.17253

273. Calderón-Garcidueñas L, González-Maciel A, Reynoso-Robles R, Silva-Pereyra HG, Torres-Jardón R, Brito-Aguilar R, Ayala A, Stommel EW, Delgado-Chávez R. Environmentally Toxic Solid Nanoparticles in Noradrenergic and Dopaminergic Nuclei and Cerebellum of Metropolitan Mexico City Children and Young Adults with Neural Quadruple Misfolded Protein Pathologies and High Exposures to Nano Particulate Matter. *Toxics*. 2022 Mar 29;10(4):164. doi: 10.3390/toxics10040164. PMID: 35448425

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Pollution and Chromosomal Function/Fetal Development/Fertility

***Babies are essentially born pre-polluted by the air breathed by the mother during pregnancy. Particulate matter and the chemicals attached to them can cross the placenta and interfere with fetal development**

*** Pregnant women exposed to more air pollution give birth to babies with significantly more chromosomal aberrations including shorter telomeres and epigenetic changes which can be passed on to multiple subsequent generations.**

- * Exposure even to brief episodes of pollution at critical stages in the development of the human embryo can increase the risk of birth defects like neural tube defects, and cause the baby as an adult to experience an increased likelihood of multiple chronic diseases including those of the heart, lungs, immune system and brain and even obesity, diabetes, cancer and shortened life expectancy.
- * Air pollution breathed by a pregnant mother causes epigenetic changes in the womb, which is associated with higher rates of lung and heart disease in animals and humans in childhood as an adult.
- * Pollution impairs virtually every component of human reproduction—causing sperm DNA damage, increase in the rates of male infertility, decreases fertilization, menstruation, and increases miscarriages and other adverse reproductive outcomes. Preconception/prenatal Air pollution exposure of the father is associated with lower birth weight of newborns.
- * Children living near petrochemical industries are exposed to high PAH levels, contributing to DNA damage. Industrial pollution is even more genotoxic than traffic pollution.
- *Regarding birth weights and poor neurologic outcomes, males are generally more affected by prenatal air pollution than females.
- *Even preconception pollution exposure of the mother increases the risk of congenital malformations

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1. Bruner-Tran, KL and KG Osteen. 2010. Developmental exposure to TCDD reduces fertility and negatively affects pregnancy outcomes across multiple generations. *Reproductive Toxicology* <http://dx.doi.org/10.1016/j.reprotox.2010.10.003>
2. Rodríguez-Trigo G, Zock J-P, Pozo-Rodríguez F, Gómez, F, et al. Health Effects in Fishermen 2 Years After Assisting With Oil Spill Clean-up *Ann Intern Med* October 19, 2010 153:I-28; published ahead of print August 23, 2010.
3. Perera F, Tang W, Herbstman J. Relation of DNA Methylation of 5-CpG Island of ACSL3 to Transplacental Exposure to Airborne PAH and Childhood Asthma.. *PLoS ONE*. Feb. 16, 2009.
4. Hansen C, Barnett A, Prichard G. The Effect of Ambient Air Pollution during Early Pregnancy on Fetal Ultrasound Measurements during Mid-Pregnancy. *Environ Health Persp* Vol. 116, Number 3, March 2008.
5. Bocskay K, Tang D, Orjuela M, et al. Chromosomal Aberrations in Cord Blood Are Associated with Prenatal Exposure to Carcinogenic Polycyclic Aromatic Hydrocarbons. *Cancer Epidemi Biomarkers and Prev.* Vol. 14, 506-511, Feb 2005
6. Perera F, Tang D, Tu Y, Biomarkers in Maternal and Newborn Blood Indicate Heightened Fetal Susceptibility to Procarcinogenic DNA Damage. *Environ Health Persp* Vol 112 Number 10 July 2004

7. Pilsner JR, Hu H, Ettinger A, Sanchez BN, et al. Influence of prenatal lead exposure on genomic methylation of cord blood DNA. *Environ Health Persp*, April 2009
8. Baccarelli A. Breathe deeply into your genes!: genetic variants and air pollution effects., *Am J Respir Crit Care Med.* 2009 Mar 15;179(6):431-2.
9. Baccarelli A, Wright RO, Bollati V, Tarantini L, Litonjua AA, Suh HH, Zanobetti A, Sparrow D, Vokonas PS, Schwartz J. Rapid DNA methylation changes after exposure to traffic particles. *Am J Respir Crit Care Med.* 2009 Apr 1;179(7):523-4.
10. Huang YC, Schmitt M, Yang Z, Que LG, Stewart JC, Frampton MW, Devlin RB. Gene expression profile in circulating mononuclear cells after exposure to ultrafine carbon particles. *Inhal Toxicol.* 2010 May 27. [Epub ahead of print]
11. Jedrychowski WA, Perera FP, Maugeri U, Mroz E, Klimaszewska-Rembiasz M, Flak E, Edwards S, Spengler JD. Effect of prenatal exposure to fine particulate matter on ventilatory lung function of preschool children of non-smoking mothers. *Paediatr Perinat Epidemiol.* 2010 Sep;24(5):492-501.
12. Thomson E, Kumarathasan P, Calderon-garcidueas L, Vincent R. Air pollution alters brain and pituitary endothelin-1 and inducible nitric oxide synthase gene expressions *Environmental Research* 2007, vol. 105, no2, pp. 224-233 [10 page(s) (article)] (1 p. 1/2)
13. Pedersen M, Wichmann J, Autrup H, Dang DA, Decordier I, Hvidberg M, Bossi R, Jakobsen J, Loft S, Knudsen LE. Increased micronuclei and bulky DNA adducts in cord blood after maternal

exposures to traffic-related air pollution. Environ Res. 2009 Nov; 109(8):1012-20. Epub 2009 Sep 23.

14. Herr CE, Dostal M, Ghosh R, Ashwood P, Lipsett M, Pinkerton KE, Sram R, Hertz- Picciotto I. Air pollution exposure during critical time periods in gestation and alterations in cord blood lymphocyte distribution: a cohort of livebirths. Environ Health. 2010 Aug 2;9(1):46.
15. Gonzalez-Pina, R. et al. (2008) Prenatal exposure to ozone disrupts cerebellar monoamine contents in newborn rats. Neurochem. Res. 33, 912–918
16. Hoxha M, Dioni L, Bonzini M, et al. Association between leukocyte telomere shortening and exposure to traffic pollution: a cross-sectional study on traffic officers and indoor office workers. Environ Health. 2009; 8: 41. Published online 2009 September 21. doi: 10.1186/1476-069X-8-41
17. Perera FP 2008. Children Are Likely to Suffer Most from Our Fossil Fuel Addiction. Environ Health Perspect 116:987-990. doi:10.1289/ehp.11173
18. Rubesa J, Rybara R, Prinosilovaa P, Veznika Z, et al. Genetic polymorphisms influence the susceptibility of men to sperm DNA damage associated with exposure to air pollution. Mutation Research 683 (2010) 9–15.
19. Rubes J, Selevan S, Evenson D, Zudova D, Vozdova M, Zudova Z, Robbins W, Perreault S. Episodic air pollution is associated with increased DNA fragmentation in human sperm without other changes in semen quality. Human Reproduction Vol.20, No.10 pp. 2776–2783, 2005 doi:10.1093/humrep/dei122. Advance Access publication June 24, 2005.

20. Zhong Y, Carmella S, Upadhyaya P, Hochalter JB, et al. Immediate Consequences of Cigarette Smoking: Rapid Formation of Polycyclic Aromatic Hydrocarbon Diol Epoxides Chem. Res. Toxicol., Article ASAP DOI: 10.1021/tx100345x Publication Date (Web): December 27, 2010
21. Topinka J, Rossner P Jr, Milcova A, Schmuczerova J, Svecova V, Sram RJ. DNA Adducts and Oxidative DNA Damage Induced by Organic Extracts From PM2.5 in an Acellular Assay. Toxicol Lett. 2011 Feb 14. [Epub ahead of print]
(Industrial PM2.5 is more genotoxic and causative of oxidative stress than traffic PM2.5)
22. Madrigano J, Baccarelli A, Mittleman MA, Wright RO, Sparrow D, Vokonas PS, Tarantini L, and Schwartz J. Prolonged exposure to particulate pollution, genes associated with glutathione pathways, and DNA methylation in a cohort of older men. Environmental Health Perspectives
<http://dx.doi.org/10.1289/ehp.1002773>.
23. Oh SM, Park YR, Kim HR, Park YJ, Kim MJ, Son BH, Lee MJ, Lee SY, Chung KH. Organic extracts of urban air pollution particulate matter (PM2.5)-induced genotoxicity and oxidative stress in human lung bronchial epithelial cells (BEAS-2B cells). Mutat Res. 2011 Apr 16. [Epub ahead of print]
24. Han X, Zhou N, Cui Z, Ma M, Li L, Cai M, et al. 2011. Association between Urinary Polycyclic Aromatic Hydrocarbon Metabolites and Sperm DNA Damage: A Population Study in Chongqing, China. Environ Health Perspect 119:652-657.
doi:10.1289/ehp. 1002340

25. Gualtieri M, Orevik J, Mollerup S, Asare N, Longhin E, Dahlman HJ, Camatini M, Holme JA. Airborne urban particles (Milan winter-PM2.5) cause mitotic arrest and cell death: Effects on DNA, mitochondria, AhR binding and spindle organization. *Mutat Res.* 2011 May 30. [Epub ahead of print]
26. Oya E, Orevik J, Arlt VM, Nagy E, Phillips DH, Holme JA. DNA damage and DNA damage response in human bronchial epithelial BEAS-2B cells following exposure to 2-nitrobenzanthrone and 3-nitrobenzanthrone: role in apoptosis. *Mutagenesis.* 2011 Jun 29. [Epub ahead of print]
27. Abbas I, Garçon G, Saint-Georges F, Andre V, Gosset P, Billet S, Goff JL, Verdin A, Mulliez P, Sichel F, Shirali P. Polycyclic aromatic hydrocarbons within airborne particulate matter (PM(2.5)) produced DNA bulky stable adducts in a human lung cell coculture model. *J Appl Toxicol.* 2011 Sep 13. doi: 10.1002/jat.1722. [Epub ahead of print]
28. Zhang A, Hu H, Sánchez BN, Ettinger AS, Park SK, Cantonwine D, et al. 2011. Association between Prenatal Lead Exposure and Blood Pressure in Female Offspring. *Environ Health Perspect* :- <http://dx.doi.org/10.1289/ehp.1103736>
29. Sánchez-Guerra M, Pelallo-Martínez N, Díaz-Barriga F, Rothenberg SJ, Hernández-Cadena L, Faugeron S, Oropeza-Hernández LF, Guaderrama-Díaz M, Quintanilla-Vega B. Environmental polycyclic aromatic hydrocarbon (PAH) exposure and DNA damage in Mexican children. *Mutat Res.* 2011 Dec 17. [Epub ahead of print]
30. Bind MA, Baccarelli A, Zanobetti A, Tarantini L, Suh H, Vokonas P, Schwartz J. Air Pollution and Markers of Coagulation, Inflammation, and Endothelial Function: Associations and

Epigene-environment Interactions in an Elderly Cohort.
Epidemiology. 2012 Jan 10. [Epub ahead of print]

31. Reddy P, Naidoo RN, Robins TG, Mentz G, Li H, London SJ, Batterman S. GSTM1 and GSTP1 gene variants and the effect of air pollutants on lung function measures in South African children. Am J Ind Med. 2012 Jan 6. doi: 10.1002/ajim.22012. [Epub ahead of print]
32. Møller P, Folkmann JK, Danielsen PH, Jantzen K, Loft S. Oxidative Stress Generated Damage to DNA by Gastrointestinal Exposure to Insoluble Particles. Curr Mol Med. 2012 Jan 27. [Epub ahead of print]
33. van den Hooven EH, de Kluizenaar Y, Pierik FH, Hofman A, van Ratingen SW, Zandveld PY, et al. 2012. Chronic Air Pollution Exposure during Pregnancy and Maternal and Fetal C-reactive Protein Levels. The Generation R Study. Environ Health Perspect :- . <http://dx.doi.org/10.1289/ehp.1104345>
34. Manikkam M, Guerrero-Bosagna C, Tracey R, Haque MM, Skinner MK (2012) Transgenerational Actions of Environmental Compounds on Reproductive Disease and Identification of Epigenetic Biomarkers of Ancestral Exposures. PLoS ONE 7(2): e31901. doi:10.1371/journal.pone.0031901
35. Herbstman JB, Tang D, Zhu D, Qu L, Sjödin A, Li Z, et al. 2012. Prenatal Exposure to Polycyclic Aromatic Hydrocarbons, Benzo[a]pyrene–DNA Adducts, and Genomic DNA Methylation in Cord Blood. Environ Health Perspect 120:733-738. <http://dx.doi.org/10.1289/ehp.1104056>
36. Janssen BG, Munters E, Pieters N, Smeets K, Cox B, Cuypers A, et al. 2012. Placental Mitochondrial DNA Content and

Particulate Air Pollution During in Utero Life. Environ Health Perspect :-.<http://dx.doi.org/10.1289/ehp.1104458>

37. Huang HB, Lai CH, Chen GW, Lin YY, Jaakkola JJ, Liou SH, Wang SL. Traffic- related air pollution and DNA damage: a longitudinal study in taiwanese traffic conductors. PLoS One. 2012;7(5):e37412. Epub 2012 May 21.
38. Orjuela M, Liu X, et al. Urinary naphthal metabolites and chromosomal aberrations in 5 yr old children. Cancer Epidemiol Biomarkers Prev, May 9, 2012 DOI: 10.1158/1055-9965.EPI-12-0214
39. Fustinoni S, Rossella F, Polledri E, Bollati V, Campo L, Byun HM, Agnello L, Consonni D, Pesatori AC, Baccarelli A, Bertazzi PA. Global DNA methylation and low- level exposure to benzene. Med Lav. 2012 Mar-Apr;103(2):84-95.
40. Madrigano J, Baccarelli A, Mittleman MA, Sparrow D, Spiro A 3rd, Vokonas PS, Cantone L, Kubzansky L, Schwartz J. Air Pollution and DNA Methylation: Interaction by Psychological Factors in the VA Normative Aging Study. Am J Epidemiol. 2012 Jul 12. [Epub ahead of print]
41. Hou L, Wang S, Dou C, Zhang X, Yu Y, Zheng Y, Avula U, Hoxha M, Díaz A, McCracken J, Barretta F, Marinelli B, Bertazzi PA, Schwartz J, Baccarelli AA. Air pollution exposure and telomere length in highly exposed subjects in Beijing, China: A repeated-measure study. Environ Int. 2012 Aug 4;48C:71-77. [Epub ahead of print]
42. Tillett T Potential Mechanism for PM10 Effects on Birth Outcomes: In Utero Exposure Linked to Mitochondrial DNA

Damage. Environ Health Perspect 120:a363- a363.
<http://dx.doi.org/10.1289/ehp.120-a363b>

43. Jedrychowski WA, Perera FP, Spengler JD, Mroz E, Stigter L, Flak E, Majewska R, Klimaszewska-Rembiasz M, Jacek R. Intrauterine exposure to fine particulate matter as a risk factor for increased susceptibility to acute broncho-pulmonary infections in early childhood. *Int J Hyg Environ Health.* 2013 Jan 16. pii: S1438-4639(12)00150-2. doi: 10.1016/j.ijheh.2012.12.014. [Epub ahead of print]
44. Jung MH, Kim HR, Park YJ, Park DS, Chung KH, Oh SM. *Mutat Res.* 2012 Dec 12;749(1-2):39-47. Genotoxic effects and oxidative stress induced by organic extracts of particulate matter(PM 10)collected from a subway tunnel in Seoul, Korea.
45. Hammond SK, Lurmann F, Shaw GM. The Association of Ambient Air Pollution and Traffic Exposures With Selected Congenital Anomalies in the San Joaquin Valley of California. *Am J Epidemiol.* 2013 Mar 28. [Epub ahead of print]
46. Hou L, Zhang X, Dioni L, Barretta F, Dou C, Zheng Y, Hoxha M, Bertazzi PA, Schwartz J, Wu S, Wang S, Baccarelli AA. Inhalable particulate matter and mitochondrial DNA copy number in highly exposed individuals in Beijing, China: a repeated-measure study. *Part Fibre Toxicol.* 2013 Apr 29;10(1):17. [Epub ahead of print]
48. Ljubimova JY, Kleinman MT, Karabalin NM, Inoue S, Konda B, Gangalum P, Markman JL, Ljubimov AV, Black KL. Gene expression changes in rat brain after short and long exposures to particulate matter in Los Angeles basin air: Comparison with human brain tumors. *Exp Toxicol Pathol.* 2013 May 17. pii:

S0940-2993(13)00054-7. doi: 10.1016/j.etc.2013.04.002. [Epub ahead of print]

49. Davis DA, Bortolato M, Godar SC, Sander TK, Iwata N, Pakbin P, Shih JC, Berhane K, McConnell R, Sioutas C, Finch CE, Morgan TE. *PLoS One*. 2013 May 29;8(5):e64128. doi: 10.1371/journal.pone.0064128. Print 2013. Prenatal exposure to urban air nanoparticles in mice causes altered neuronal differentiation and depression-like responses.
50. Prasad BS, Vidyullatha P, Venkata RP, Tirumala VG, Varre S, Penagaluru UR, Grover P, Mundluru HP, Penagaluru PR. Evaluation of oxidative stress and DNA damage in traffic policemen exposed to vehicle exhaust. *Biomarkers*. 2013 Jun 5. [Epub ahead of print]
51. Janssen BG, Godderis L, Pieters N, Poels K, Kici Ski M, Cuypers A, Fierens F, Penders J, Plusquin M, Gyselaers W, Nawrot TS. Placental DNA hypomethylation in association with particulate air pollution in early life. Part Fibre Toxicol. 2013 Jun 7;10(1):22. [Epub ahead of print]
52. Koehler C, Thielen S, Ginzkey C, Hackenberg S, Scherzed A, Burghartz M, Paulus M, Hagen R, Kleinsasser NH. Nitrogen dioxide is genotoxic in urban concentrations. *Inhal Toxicol*. 2013 May 23. [Epub ahead of print]
53. Slama R, Bottagisi S, Solansky I, Lepeule J, Giorgis-Allemand L, Sram R. Short-Term Impact of Atmospheric Pollution on Fecundability. *Epidemiology*. 2013 Sep 18. [Epub ahead of print]
54. Demarini DM. Genotoxicity biomarkers associated with exposure to traffic and near-road atmospheres: a review.

Mutagenesis. 2013 Sep;28(5):485-505. doi: 10.1093/mutage/get042.

55. Perera F, et al. Prenatal Exposure to Air Pollution, Maternal Psychological Distress, and Child Behavior. Pediatrics, October 2013,

56. Demarini DM. Genotoxicity biomarkers associated with exposure to traffic and near-road atmospheres: a review. Mutagenesis. 2013 Sep;28(5):485-505. doi: 10.1093/mutage/get042.

57. Bass V, Gordon CJ, Jarema KA, Macphail RC, Cascio WE, Phillips PM, Ledbetter AD, Schladweiler MC, Andrews D, Miller D, Doerfler DL, Kodavanti UP. Ozone Induces Glucose Intolerance and Systemic Metabolic Effects in Young and Aged Brown Norway Rats. Toxicol Appl Pharmacol. 2013 Oct 5. pii: S0041-008X(13)00429-8. doi: 10.1016/j.taap.2013.09.029. [Epub ahead of print]

58. Weldy CS, Y Liu, YC Chang, IO Medvedev, JR Fox, TV Larson, WM Chien, MT Chin. In utero and early life exposure to diesel exhaust air pollution increases adult susceptibility to heart failure in mice. Particle and Fibre Toxicology. 2013. <http://bit.ly/18znRIR>

59. Guo L, Byun HM, Zhong J, Motta V, Barupal J, Zheng Y, Dou C, Zhang F, McCracken JP, Diaz A, Marco SG, Colicino S, Schwartz J, Wang S, Hou L, Baccarelli AA. Effects of short-term exposure to inhalable particulate matter on DNA methylation of tandem repeats. Environ Mol Mutagen. 2014 Jan 17. doi: 10.1002/em.21838. [Epub ahead of print]

60. Shang Y1, Zhang L1, Jiang Y1, Li Y2, Lu P3. Airborne quinones induce cytotoxicity and DNA damage in human lung epithelial A549 cells: The role of reactive oxygen species. *Chemosphere*. 2014 Jan 27 pii:S0045-6535(14)00016-2. doi: 10.1016/j.chemosphere.2013.12.079. [Epub ahead of print]
61. de Kok TM, Driece HA, Hogervorst JG, Briedé JJ. Toxicological assessment of ambient and traffic-related particulate matter: a review of recent studies. *Mutat Res.* 2006 Nov-Dec;613(2-3):103-22. Epub 2006 Sep 1.
62. XU DQ, ZHANG W. Monitoring of Pollution of Air Fine Particles (PM_{2.5}) and Study on Their Genetic Toxicity *BIOMEDICAL AND ENVIRONMENTAL SCIENCES* 17, 452-458(2004)
63. Yu-Ting L, Yungling L, Chau-Ren J, et al. Air pollution and limb defects: A matched- pairs case-control study in Taiwan. *Environmental Research*. Volume 132, July 2014, Pages 273–280
64. Wick P, Malek A, Manser P, Meili D, Maeder-Althaus X, Diener L, et al. 2010. Barrier capacity of human placenta for nanosized materials. *Environ Health Perspect* 118:432-436.
65. Brocato J, Sun H, Shamy M, Kluz T, Alghamdi MA, Khoder MI, Chen LC, Costa M. Particulate matter from Saudi Arabia induces genes involved in inflammation, metabolic syndrome and atherosclerosis. *J Toxicol Environ Health A*. 2014;77(13):751-66. doi: 10.1080/15287394.2014.892446.
66. Fossati S, Baccarelli A, Zanobetti A, Hoxha M, Vokonas PS, Wright RO, Schwartz J. Ambient particulate air pollution and microRNAs in elderly men. *Epidemiology*. 2014 Jan;25(1):68-78. doi: 10.1097/EDE.0000000000000026.

67. Tao MH, Zhou J, Rialdi AP, Martinez R, Dabek J, Scelo G, Lissowska J, Chen J, Boffetta P. Indoor air pollution from solid fuels and peripheral Blood DNA methylation: Findings from a population study in Warsaw, Poland. *Environ Res.* 2014 Sep 5;134C:325-330. doi: 10.1016/j.envres.2014.08.017. [Epub ahead of print]
68. Jedrychowski W, et al. Gender differences in fetal growth of newborns exposed prenatally to airborne fine particulate matter. *Environmental Research.* Volume 109, Issue 4, May 2009, Pages 447–456
69. Sancini G, Farina F, Battaglia C, Cifola I, Mangano E, Mantecca P, Camatini M, Palestini P. Health Risk Assessment for Air Pollutants: Alterations in Lung and Cardiac Gene Expression in Mice Exposed to Milano Winter Fine Particulate Matter (PM_{2.5}). *PLoS One.* 2014 Oct 8;9(10):e109685. doi: 10.1371/journal.pone.0109685. eCollection 2014.
70. Neophytou AM, Hart JE, Chang Y, Zhang JJ, Smith TJ, Garshick E, Laden F. Short-term traffic related exposures and biomarkers of nitro-PAH exposure and oxidative DNA damage. *Toxics.* 2014 Sep;2(3):377-390.
71. Farhia A, et al. The possible association between exposure to air pollution and the risk for congenital malformations. *Environmental Research,* Volume 135, November 2014, Pages 173–180
72. Morales E, et al. Intrauterine and early postnatal exposure to outdoor air pollution and lung function at preschool age. *Thorax,* 2014; DOI: 10.1136/thoraxjnl-2014-205413

73. Bolton JL, Auten RL, Bilbo SD. Prenatal air pollution exposure induces sexually dimorphic fetal programming of metabolic and neuroinflammatory outcomes in adult offspring. *Brain Behav Immun.* 2014 Mar;37:30-44. doi: 10.1016/j.bbi.2013.10.029. Epub 2013 Nov 1.
74. Carmona JJ, Sofer T, Hutchinson J, Cantone L, Coull B, Maity A, Vokonas P, Lin X, Schwartz J, Baccarelli AA. Short-term airborne particulate matter exposure alters the epigenetic landscape of human genes associated with the mitogen-activated protein kinase network: a cross-sectional study. *Environ Health.* 2014 Nov 13;13(1):94. [Epub ahead of print]
75. Møller P, Danielsen PH, Karottki DG, Jantzen K, Roursgaard M, Klingberg H, Jensen DM, Christophersen DV, Hemmingsen JG, Cao Y, Loft S. Oxidative stress and inflammation generated DNA damage by exposure to air pollution particles. *Mutat Res Rev Mutat Res.* 2014 October - December;762C:133-166. doi: 10.1016/j.mrrev.2014.09.001. Epub 2014 Sep 16.
76. Fan T, Fang SC, Cavallari JM, Barnett IJ, Wang Z, Su L, Byun HM, Lin X, Baccarelli AA, Christiani DC. Heart rate variability and DNA methylation levels are altered after short-term metal fume exposure among occupational welders: a repeated-measures panel study. *BMC Public Health.* 2014 Dec 16;14(1):1279. [Epub ahead of print]
77. Bijnens E, Zeegers MP, Gielen M, Kicinski M, Hageman GJ, Pachen D, Derom C, Vlietinck R, Nawrot TS. Lower placental telomere length may be attributed to maternal residential traffic exposure; a twin study. *Environ Int.* 2015 Mar 7;79:1-7. doi: 10.1016/j.envint.2015.02.008. [Epub ahead of print]

78. Jurewicz J, Radwan M, Sobala W, Polańska K, Radwan P, Jakubowski L, Ułańska A, Hanke W. The relationship between exposure to air pollution and sperm disomy. *Environ Mol Mutagen*. 2015 Jan;56(1):50-9. doi: 10.1002/em.21883. Epub 2014 Jul 3.
79. Seamen N, et al. In Utero Fine Particle Air Pollution and Placental Expression of Genes in the Brain-Derived Neurotrophic Factor Signaling Pathway: An ENVIRONAGE Birth Cohort Study. *Environ Health Perspect*; DOI:10.1289/ehp.1408549
80. Janssen BG, Byun HM, Gyselaers W, Lefebvre W, Baccarelli AA, Nawrot TS. Placental mitochondrial methylation and exposure to airborne particulate matter in the early life environment: An ENVIRONAGE birth cohort study. *Epigenetics*. 2015 May 21:0. [Epub ahead of print]
81. Kim JT, Son MH, Lee DH, Seong WJ, Han S, Chang YS. Partitioning Behavior of Heavy Metals and Persistent Organic Pollutants among Feto-Maternal Bloods and Tissues. *Environ Sci Technol*. 2015 Jun 16;49(12):7411-22. doi: 10.1021/es5051309. Epub 2015 Jun 5.
82. Duan H, et al. Long-term exposure to diesel engine exhaust induces primary DNA damage: a population-based study. *Occup Environ Med*. 2015 Oct 21. pii: oemed-2015-102919. doi: 10.1136/oemed-2015-102919. [Epub ahead of print]
83. Grevendonk L, et al. Mitochondrial oxidative DNA damage and exposure to particulate air pollution in mother-newborn pairs. *Environmental Health* 2016, 15:10
84. Hou L, et al. Particulate Air Pollution Exposure and Expression of Viral and Human MicroRNAs in Blood: The Beijing

Truck Driver Air Pollution Study. Environ Health Perspect; DOI:10.1289/ehp.1408519

85. Abbas I, et al. In vitro short-term exposure to air pollution PM2.5-0.3 induced cell cycle alterations and genetic instability in a human lung cell coculture model. *Environ Res.* 2016 Feb 10;147:146-158. doi: 10.1016/j.envres.2016.01.041. [Epub ahead of print]
86. Tsamou M, et al. Air pollution-induced placental epigenetic alterations in early life: a candidate miRNA approach. *Epigenetics.* 2016 Apr 22:0. [Epub ahead of print]
87. Liu CB, et al. Effects of Prenatal PM10 Exposure on Fetal Cardiovascular Malformations in Fuzhou, China: A Retrospective Case-Control Study. *Environ Health Perspect.* 2016 Jul 6. [Epub ahead of print]
88. Martens DS, Nawrot TS. Air Pollution Stress and the Aging Phenotype: The Telomere Connection. *Curr Environ Health Rep.* 2016 Jun 29. [Epub ahead of print]
89. Veras MM, et al. Before the first breath: prenatal exposures to air pollution and lung development. *Cell Tissue Res.* 2016 Oct 10. [Epub ahead of print]
90. Ding R, et al. Dose- and time- effect responses of DNA methylation and histone H3K9 acetylation changes induced by traffic-related air pollution. *Sci Rep.* 2017 Mar 3;7:43737. doi: 10.1038/srep437
91. Lin N, et al. Accumulative effects of indoor air pollution exposure on leukocyte telomere length among non-smokers.

Environ Pollut. 2017 Apr 24;227:1-7. doi:
10.1016/j.envpol.2017.04.054. [Epub ahead of print]

92. Lai CH, et al. Exposure to fine particulate matter causes oxidative and methylated DNA damage in young adults: A longitudinal study. Sci Total Environ. 2017 Apr 23;598:289-296. doi: 10.1016/j.scitotenv.2017.04.079. [Epub ahead of print]

93. Lee E, et al. Traffic-Related Air Pollution and Telomere Length in Children and Adolescents Living in Fresno, CA. Journal of Occupational and Environmental Medicine, 2017; 59 (5): 446 DOI: 10.1097/JOM.0000000000000996

94. Mao G, et al. Individual and Joint Effects of Early-Life Ambient PM_{2.5} Exposure and Maternal Prepregnancy Obesity on Childhood Overweight or Obesity. Environ Health Perspect; DOI:10.1289/EHP261

95. de Oliveira A, et al. Biomass burning in the Amazon region causes DNA damage and cell death in human lung cells. Sci Rep. 2017 Sep 7;7(1):10937. doi: 10.1038/s41598-017-11024-3.

96. Kingsley SL, et al. Maternal residential air pollution and placental imprinted gene expression. Environ Int. 2017 Sep 5;108:204-211. doi: 10.1016/j.envint.2017.08.022. [Epub ahead of print]

97. Huang Q, et al. Fine particulate matter 2.5 exerted its toxicological effect by regulating a new layer, long non-coding RNA. Sci Rep. 2017 Aug 24;7(1):9392. doi: 10.1038/s41598-017-09818-6.

98. Goodson J, et al. In utero exposure to diesel exhaust particulates is associated with an altered cardiac transcriptional

response to transverse aortic constriction and altered DNA methylation. *The FASEB Journal*, 2017; *fj.201700032R* DOI: 10.1096/fj.201700032R

99. Martens DS, et al. Prenatal Air Pollution and Newborns' Predisposition to Accelerated Biological Aging. *JAMA Pediatr.* 2017 Oct 16. doi: 10.1001/jamapediatrics.2017.3024. [Epub ahead of print]
100. Qiu L, et al. Exposure to Concentrated Ambient PM_{2.5} Compromises Spermatogenesis in a Mouse Model: Role of Suppression of Hypothalamus-Pituitary-Gonads Axis. *Toxicol Sci.* 2017 Nov 20. doi: 10.1093/toxsci/kfx261. [Epub ahead of print]
101. Ren S, et al. Periconception Exposure to Air Pollution and Risk of Congenital Malformations. *The Journal of Pediatrics*, 2017; DOI: 10.1016/j.jpeds.2017.09.076
102. Mahalingaiah S, et al. Perimenarchal air pollution exposure and menstrual disorders. *Human Reproduction*, 2018; DOI: 10.1093/humrep/dey005
103. Zhou N, et al. Exposures to Atmospheric PM₁₀ and PM_{10-2.5} Affect Male Semen Quality: Results of MARHCS Study. *Environ Sci Technol.* 2018 Jan 11. doi: 10.1021/acs.est.7b05206. [Epub ahead of print]
104. Radwan M, et al. Air Pollution and Human Sperm Sex Ratio. *Am J Mens Health.* 2018 Jan 1:1557988317752608. doi: 10.1177/1557988317752608. [Epub ahead of print]
105. Nemmar A, et al. Thrombosis, systemic and cardiac oxidative stress and DNA damage induced by pulmonary

exposure to diesel exhaust particles, and the effect of nootkatone thereon. *Am J Physiol Heart Circ Physiol.* 2018 Jan 5. doi: 10.1152/ajpheart.00313.2017. [Epub ahead of print]

106. Chen R, et al. Fine Particulate Air Pollution and the Expression of microRNAs and Circulating Cytokines Relevant to Inflammation, Coagulation, and Vasoconstriction. *Environ Health Perspect.* 2018 Jan 17;126(1):017007. doi: 10.1289/EHP1447.

107. Krauskopf J, Caiment F, van Veldhoven K, Chadeau-Hyam M, Sinharay R, Chung KF, Cullinan P, Collins P, Barratt B, Kelly FJ, Vermeulen R, Vineis P, de Kok TM, Kleinjans JC. The human circulating miRNome reflects multiple organ disease risks in association with short-term exposure to traffic-related air pollution. *Environ Int.* 2018 Jan 27;113:26-34. doi: 10.1016/j.envint.2018.01.014. [Epub ahead of print] PMID: 29421404 [PubMed - as supplied by publisher]

108. Jie Y, et al. Changes in gene expression in lungs of mice exposed to traffic-related air pollution. *Mol Cell Probes.* 2018 Apr 2. pii: S0890-8508(18)30034-3. doi: 10.1016/j.mcp.2018.03.005. [Epub ahead of print].

109. Plusquin M, et al. DNA methylome marks of exposure to particulate matter at three time points in early life. *Environ Sci Technol.* 2018 Mar 30. doi: 10.1021/acs.est.7b06447. [Epub ahead of print]

110. Favé M-J, et al. Gene-by-environment interactions in urban populations modulate risk phenotypes. *Nature Communications,* 2018; 9 (1) DOI: 10.1038/s41467-018-03202-2

111. Domingues ÉP, et al. Genotoxic effects following exposure to air pollution in street vendors from a high-traffic urban area.

Environ Monit Assess. 2018 Mar 14;190(4):215. doi: 10.1007/s10661-018-6598-2.

112. Bosco L, et al. Sperm DNA fragmentation: An early and reliable marker of air pollution. Environ Toxicol Pharmacol. 2018 Feb 7;58:243-249. doi: 10.1016/j.etap.2018.02.001. [Epub ahead of print]
113. Maghbooli Z, et al. Air pollution during pregnancy and placental adaptation in the levels of global DNA methylation. PLoS One. 2018 Jul 6;13(7):e0199772. doi: 10.1371/journal.pone.0199772. eCollection 2018.
114. Peng C, et al. Residential Proximity to Major Roadways at Birth, DNA Methylation at Birth and Midchildhood, and Childhood Cognitive Test Scores: Project Viva(Massachusetts, USA) Published: 18 September 2018, DOI: <https://doi.org/10.1289/EHP2034>
115. Ledda C, et al. Mutagenic and DNA repair activity in traffic policemen: a case-crossover study. J Occup Med Toxicol. 2018 Aug 8;13:24. doi: 10.1186/s12995-018-0206-9. eCollection 2018.
116. He T, et al. Ambient air pollution, H19/DMR methylation in cord blood and newborn size: A pilot study in Zhengzhou City, China. Chemosphere. 2018 Aug 30;212:863-871. doi: 10.1016/j.chemosphere.2018.08.140. [Epub ahead of print]
117. Zhao B, et al. Air pollution and telomere length: a systematic review of 12,058 subjects. Cardiovasc Diagn Ther. 2018 Aug;8(4):480-492. doi: 10.21037/cdt.2018.06.05.
118. Tanwar V, et al. Preconception Exposure to Fine Particulate Matter Leads to Cardiac Dysfunction in Adult Male Offspring.

Journal of the American Heart Association, 2018; 7 (24) DOI: 10.1161/JAHA.118.010797

119. Stapleton P. Should Perturbation of the Preconceptive Environment be Considered a Risk Factor for the Development of Cardiovascular Disease Later in Life? *J Am Heart Assoc.* 2018 Dec 18;7(24):e011249. doi: 10.1161/JAHA.118.011249.
120. Alvarado-Cruz I, et al. Environmental Epigenetic Changes, as Risk Factors for the Development of Diseases in Children: A Systematic Review. *Ann Glob Health.* 2018 Jul 27;84(2):212-224. doi: 10.29024/aogh.909.
121. Goodson JM, et al. In utero exposure to diesel exhaust is associated with alterations in neonatal cardiomyocyte transcription, DNA methylation and metabolic perturbation. Part Fibre Toxicol. 2019 Apr 11;16(1):17. doi: 10.1186/s12989-019-0301-9.
122. Ren L, et al. Silica nanoparticles induce spermatocyte cell apoptosis through microRNA-2861 targeting death receptor pathway. *Chemosphere.* 2019 Apr 27;228:709-720. doi: 10.1016/j.chemosphere.2019.04.116. [Epub ahead of print].
123. Cao Z, et al. Maternal exposure to ambient fine particulate matter and fetal growth in Shanghai, China. *Environ Health.* 2019 May 16;18(1):49. doi: 10.1186/s12940-019-0485-3.
124. Zhou G, et al. Prenatal ambient air pollution exposure and SOD2 promoter methylation in maternal and cord blood. *Ecotoxicol Environ Saf.* 2019 Jun 17;181:428-434. doi: 10.1016/j.ecoenv.2019.06.039. [Epub ahead of print]

125. Lavigne E, et al. Spatial variations in ambient ultrafine particle concentrations and risk of congenital heart defects. *Environ Int.* 2019 Jul 1;130:104953. doi: 10.1016/j.envint.2019.104953. [Epub ahead of print]
126. Gaskins AJ, et al. Time-Varying Exposure to Air Pollution and Outcomes of in Vitro Fertilization among Couples from a Fertility Clinic. *Environ Health Perspect.* 2019 Jul;127(7):77002. doi: 10.1289/EHP4601. Epub 2019 Jul 3.
127. Clemente DBP, et al. Prenatal and Childhood Traffic-Related Air Pollution Exposure and Telomere Length in European Children: The HELIX Project. *Environ Health Perspect.* 2019 Aug;127(8):87001. doi: 10.1289/EHP4148. Epub 2019 Aug 8.
128. Li S, et al. Exposure-Response Associations of Household Air Pollution and Buccal Cell Telomere Length in Women Using Biomass Stoves. *Environ Health Perspect.* 2019 Aug;127(8):87004. doi: 10.1289/EHP4041. Epub 2019 Aug 8.
129. Ma Y, et al. Effect of combustion-derived particles on genotoxicity and telomere length: a study on human cells and exposed populations. *Toxicol Lett.* 2020 Jan 7. pii: S0378-4274(20)30002-3. doi: 10.1016/j.toxlet.2020.01.002. [Epub ahead of print]
130. Huang C, et al. Periconceptional exposure to air pollution and congenital hypospadias among full-term infants. *Environ Res.* 2020 Jan 17;183:109151. doi: 10.1016/j.envres.2020.109151. [Epub ahead of print]
131. Sun X, et al. Prenatal exposure to residential PM_{2.5} and anogenital distance in infants at birth: A

birth cohort study from Shanghai, China. Environ Pollut. 2020 Apr 27;264:114684. doi: 10.1016/j.envpol.2020.114684. [Epub ahead of print]

132. Ravindra K, Chanana N, Mor S. Exposure to air pollutants and risk of congenital anomalies: A systematic review and metaanalysis. Sci Total Environ. 2020 Oct 7:142772. doi: 10.1016/j.scitotenv.2020.142772.

133. Zhang JY, et al. Maternal exposure to ambient levels of sulfur dioxide and risk of neural tube defects in 14 cities in Liaoning province, China: a population-based case-control study. J Expo Sci Environ Epidemiol. 2020 Oct 1. doi: 10.1038/s41370-020-00273-6. Online ahead of print. PMID: 33005007

134. Wright R, et al. Prenatal Ambient Ultrafine Particle Exposure and Childhood Asthma in the Northeastern United States. American Journal of Respiratory and Critical Care Medicine, 2021; DOI: 10.1164/rccm.202010-3743OC

135. Amaia Irizar, Arantxa Txintxurreta, Amaia Molinuevo, Alba Jimeno-Romero, Asier Anabitarte, Jon Iñaki Álvarez, María Dolores Martínez, Loreto Santa-Marina, Jesús Ibarluzea, Aitana Lertxundi. Association between prenatal exposure to air pollutants and newborn thyroxine (T4) levels. Environmental Research, 2021; 197: 111132 DOI: 10.1016/j.envres.2021.111132

136. Kaali S, Jack D, Opoku-Mensah J, Bloomquist T, Aanaro J, Quinn A, Boamah-Kaali EA, Kinney P, Mujtaba MN, Agyei O, Yawson AK, Osei-Owusu S, Delimini R, Wylie B, Ae-Ngibise KA, Baccarelli A, Owusu-Agyei S, Chillrud SN, Asante KP, Lee A. Prenatal Household Air Pollution Exposure, Cord Blood Mononuclear Cell Telomere Length and Age Four Blood Pressure:

Evidence from a Ghanaian Pregnancy Cohort. *Toxics*. 2021 Jul 14;9(7):169. doi: 10.3390/toxics9070169. PMID: 34357912.

137. Harney E, et al. Pollution induces epigenetic effects that are stably transmitted across multiple generations. *Evolution Letters*, 2022; DOI: 10.1002/evl3.273

138. Kaali S, et al. Prenatal Household Air Pollution Exposure, Cord Blood Mononuclear Cell Telomere Length and Age Four Blood Pressure: Evidence from a Ghanaian Pregnancy Cohort. *Toxics*. 2021 Jul 14;9(7):169. doi: 10.3390/toxics9070169. PMID: 34357912; PMCID: PMC8309911.

139. Zhang JY, Dai HX, Wu QJ, Li J, Huang YH, Chen ZJ, Li LL, Chen YL, Liu S, Jiang CZ. Maternal exposure to ambient levels of sulfur dioxide and risk of neural tube defects in 14 cities in Liaoning province, China: a population-based case-control study. *J Expo Sci Environ Epidemiol*. 2020 Oct 1. doi: 10.1038/s41370-020-00273-6.

140. García-Serna AM, et al. NELA Study Group. Cytokine profiles in cord blood in relation to prenatal traffic-related air pollution: The NELA cohort. *Pediatr Allergy Immunol*. 2022 Feb;33(2):e13732. doi: 10.1111/pai.13732. PMID: 35212052

141. Payne-Sturges DC, Puett R, Cory-Slechta DA. Both parents matter: a national-scale analysis of parental race/ethnicity, disparities in prenatal PM_{2.5} exposures and related impacts on birth outcomes. *Environ Health*. 2022 May 6;21(1):47. doi: 10.1186/s12940-022-00856-w. PMID: 35513869.

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Pollution and Birth Outcomes

Air pollution causes systemic inflammation in the pregnant mother, morphologic changes in the placenta, narrowing blood vessels, and inhibiting blood transfer to the fetus. Pollution nanoparticles can be found embedded in the placenta itself.

Pregnant women exposed to more air pollution have multiple clinical adverse pregnancy outcomes including: higher blood pressure, higher rates of pre-eclampsia, intrauterine growth retardation, decreased gestational age at delivery, miscarriages, still births, higher rates of gestational diabetes, premature birth, premature rupture of membranes (PROM), low birth weight syndrome, neonates with smaller head circumference, and heart and spinal cord birth defects.

Intrauterine inflammation, a significant risk factor for premature birth, is increased with air pollution exposure during pregnancy and even prior to conception.

Hourly increases in air pollution at the beginning of labor is associated with higher rates of premature birth.

Both acute and chronic ozone exposure is related to increased rates of still births, even exposure just in the several days prior to delivery.

Babies born within 3 km of an oil and gas drilling site had a lower birth weight than babies in the same area born before the drilling took place.

Folate supplements can offset the negative impact of air pollution on the success of assisted reproduction.

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1. Forbes LJ, Kapetanakis V, Rudnicka AR, Cook DG, Bush T, Stedman JR, Whincup PH, Strachan DP, Anderson HR. Nascimento LF, Moreira DA. Are environmental pollutants risk factors for low birth weight? Cad Saude Publica. 2009 Aug;25(8):1791-6.
2. van den Hooven EH, de Kluizenaar Y, Pierik FH, Hofman A, van Ratingen SW, Zandveld PY, Mackenbach JP, Steegers EA, Miedema HM, Jaddoe VW. Air Pollution, Blood Pressure, and the Risk of Hypertensive Complications During Pregnancy: The Generation R Study. *Hypertension*. 2011 Jan 10. [Epub ahead of print]

3. Yorifuji T, Naruse H, Kashima S, Ohki S, Murakoshi T, Takao S, Tsuda T, Doi H. Residential Proximity to Major Roads and Preterm Births. *Epidemiology*. 2010 Nov 3. [Epub ahead of print].
4. Lupo, PJ, E Symanski, DK Waller, MA Canfield and LE Mitchellet. 2010. Maternal exposure to ambient levels of benzene and neural tube defect among offspring, Texas, 1999-2004. *Environmental Health Perspectives* 2011 Mar; 119(3): 397–402. Published online 2010 Oct 5. doi: 10.1289/ehp.1002212
5. Rahman, Anisur. Arsenic Exposure and Risk of Spontaneous Abortion, Stillbirth, and Infant Mortality. *Epidemiology*. November 2010 - Volume 21 - Issue 6 - pp 797-804 doi: 10.1097/EDE.0b013e3181f56a0d
6. Bell ML, Belanger K, Ebisu K, Gent JF, Lee HJ, Koutrakis P, Leaderer BP. Prenatal Exposure to Fine Particulate Matter and Birth Weight: Variations by Particulate Constituents and Sources. *Epidemiology*. 2010 Aug 31. [Epub ahead of print]
7. Suzuki, T., Oshio, S., Iwata, M., et al. In utero exposure to a low concentration of diesel exhaust affects spontaneous locomotor activity and monoaminergic system in m
8. Veras MM, Damaceno-Rodregues N, Caldini E, Ribeiro A, et al. Particulate Urban Air Pollution Affects the Functional Morphology of Mouse Placenta. *Biology of Reproduction* Sept. 1, 2008 vol. 79 no. 3 578-584.
9. Hansen C, Barnett A, Prichard G. The Effect of Ambient Air Pollution during Early Pregnancy on Fetal Ultrasound Measurements during Mid-Pregnancy. *Environ Health Persp* Vol. 116, Number 3, March 2008

10. Wu J, Ren C, Delfino RJ, Chung J, Wilhelm M, Ritz B 2009. Association between Local Traffic-Generated Air Pollution and Preeclampsia and Preterm Delivery in the South Coast Air Basin of California. *Environ Health Perspect* 117:1773-1779. doi: 10.1289/ehp.0800334
11. Ritz B, Yu F, Fruin S, Chapa G, Shaw G, Harris J. Ambient Air Pollution and Risk of Birth Defects in Southern California. *Am. J. Epidemiol.* (2002) 155(1): 17-25 doi: 10.1093/aje/155.1.17
12. Vrijheid M, Martinez D, Manzanares S, Dadvand P, Schembari A, Rankin J, Nieuwenhuijsen M. *Environ Health Perspect.* 2010 Dec 3. [Epub ahead of print] Ambient Air Pollution and Risk of Congenital Anomalies: A Systematic Review and Meta-Analysis.
13. Dadvand P, Rankin J, Rushton S, Pless-Mulloli T. Ambient air pollution and congenital heart diseases
14. Estarlich M, et al. Residential exposure to outdoor air pollution during pregnancy and anthropometric measures at birth in a multicenter cohort in spain. *Environmental Health Perspectives*, in press. Posted online March 23, 2011. doi: 10.1289/ehp.1002918
15. Hwang BF, Lee YL, Jaakkola JJ. Air Pollution and Stillbirth: A Population-Based Case-Control Study in Taiwan. *Environ Health Perspect.* 2011 Mar 28. [Epub ahead of print]
16. Lee PC, Talbott EO, Roberts JM, Catov JM, Sharma RK, Ritz B. Particulate Air Pollution Exp
17. Darrow LA, Klein M, Strickland MJ, Mulholland JA, Tolbert PE 2011. Ambient Air Pollution and Birth Weight in Full-Term Infants

in Atlanta, 1994–2004. Environ Health Perspect 119:731–737. doi:10.

18. Salihu HM, August EM, Mbah AK, Alio AP, de Cuba R 2nd, Jaward FM, Berry EL. Effectiveness of a Federal Healthy Start Program in Reducing the Impact of Particulate Air Pollutants on Feto-Infant Morbidity Outcomes. Matern Child Health J. 2011 Jul 17. [Epub ahead of print]
19. Wilhelm M, Ghosh JK, Su J, Cockburn M, Jerrett M, Ritz B. Traffic-Related Air Toxics and Term Low Birth Weight in Los Angeles County, California. Environ Health Perspect. 2011 Aug 11. [Epub ahead of print]
20. Jedrychowski W¹, Perera F, Mrozek-Budzyn D, Mroz E, Flak E, Spengler JD, Edwards S, Jacek R, Kaim I, Skolicki Z. Gender differences in fetal growth of newborns exposed prenatally to airborne fine particulate matter. Environ Res. 2009 May;109(4):447–56. doi: 10.1016/j.envres.2009.01.009. Epub 2009 Mar 3.
21. ChunMei L, et al. Effects of Exposure to Nanoparticle-rich Diesel Exhaust on Pregnancy in Rats. J Reprod Dev. 2013 Apr; 59(2): 145–150. Published online 2012 Dec 20. doi: 10.1262/jrd.2012-145
22. Pereira G, Nassar N, Cook A, Bow C. Traffic emissions are associated with reduced fetal growth in areas of Perth, Western Australia: an application of the AusRoads dispersion model. Australian and New Zealand Journal of Public Health. Volume 35, Issue 5, pages 451–458, October 2011
23. Wilhelm M, Ghosh JK, Su J, Cockburn M, Jerrett M, Ritz B. Traffic-related air toxics and preterm birth: a population-based

case-control study in Los Angeles County, California.
Environmental Health 2011, 10:89 doi:10.1186/1476-069X-10-89

24. Ren A, Qiu X, Jin L, Ma J, Li Z, et al. Association of selected persistent organic pollutants in the placenta with the risk of neural tube defects. PNAS 2011 : 1105209108v1-201105209.

25. van den Hooven EH, Pierik FH, de Kluizenaar Y, Willemsen SP, Hofman A, van Ratingen SW, et al. 2011. Air Pollution Exposure During Pregnancy, Ultrasound Measures of Fetal Growth, and Adverse Birth Outcomes: A Prospective Cohort Study. Environ Health Perspect :-.

<http://dx.doi.org/10.1289/ehp.1003316>

26. Yorifuji T, Naruse H, Kashima S, Murakoshi T, Tsuda T, Doi H, Kawachi I. Residential proximity to major roads and placenta/birth weight ratio. Sci Total Environ. 2011 Dec 3. [Epub ahead of print]

27. Olsson D, Ekström M, Forsberg B. Temporal Variation in Air Pollution Concentrations and Preterm Birth—A Population Based Epidemiological Study. Int. J. Environ. Res. Public Health 2012, 9, 272-285; doi:10.3390/ijerph9010272

28. Le HQ, Batterman SA, Wirth JJ, Wahl RL, Hoggatt KJ, Sadeghnejad A, Hultin ML, Depa M. Air pollutant exposure and preterm and term small-for-gestational-age births in Detroit, Michigan: Long-term trends and associations. Environ Int. 2012 Feb 6. [Epub ahead of print]

29. Jedrychowski WA, Perera FP, Maugeri U, Spengler J, Mroz E, Flak E, Stigter L, Majewska R, Kaim I, Sowa A, Jacek R. Prohypertensive Effect of Gestational Personal Exposure to Fine Particulate Matter. Prospective Cohort Study in Non-smoking and

Non-obese Pregnant Women. *Cardiovasc Toxicol.* 2012 Feb 11. [Epub ahead of print]

30. Olsson D, Ekström M, Forsberg B. *Int J Environ Res Public Health.* 2012 Jan;9(1): 272-85. Epub 2012 Jan 18. Temporal variation in air pollution concentrations and preterm birth-a population based epidemiological study.
31. Ghosh JK, Wilhelm M, Su J, Goldberg D, Cockburn M, Jerrett M, Ritz B. Assessing the Influence of Traffic-related Air Pollution on Risk of Term Low Birth Weight on the Basis of Land-Use-based Regression Models and Measures of Air Toxics. *Am J Epidemiol.* 2012 May 13. [Epub ahead of print]
32. Kloog I, Melly SJ, Ridgway WL, Coull BA, Schwartz J. Using New Satellite Based Exposure Methods to Study the Association Between Pregnancy PM 2.5 Exposure, Premature Birth And Birth Weight In MassachusettsUsing new satellite based exposure methods to study the association between pregnancy pm2.5 exposure, premature birth and birth weight in Massachusetts. *Environ Health.* 2012 Jun 18;11(1):40. [Epub ahead of print]
33. Faiz AS, Rhoads GG, Demissie K, Kruse L, Lin Y, Rich DQ. Ambient Air Pollution and the Risk of Stillbirth. *Am J Epidemiol.* 2012 Jul 18. [Epub ahead of print] PMID: 22811493
34. Miranda ML, Edwards SE, Chang HH, Auten RL. Proximity to roadways and pregnancy outcomes. *J Expo Sci Environ Epidemiol.* 2012 Jul 18. doi: 10.1038/jes.2
35. Lee PC, Talbott EO, Roberts JM, Catov JM, Bilonick RA, Stone RA, Sharma RK, Ritz B. Ambient air pollution exposure and blood pressure changes during pregnancy. *Environ Res.* 2012 Jul 24. [Epub ahead of print]

36. Proietti E, Röösli M, Frey U, Latzin P. Air Pollution During Pregnancy and Neonatal Outcome: A Review. *J Aerosol Med Pulm Drug Deliv.* 2012 Aug 2. [Epub ahead of print]
37. Pereira G, Cook AG, Haggar F, Bower C, Nassar N. Locally derived traffic-related air pollution and fetal growth restriction: a retrospective cohort study. *Occup Environ Med.* 2012 Jul 31. [Epub ahead of print]
38. Faiz A, Rhoads G, Demissie K, Kruse L, Lin Y, Rich D. Ambient Air Pollution and the Risk of Stillbirth. *Am. J. Epidemiol.* (2012) 176(4): 308-316 doi:10.1093/aje/kws029
39. Pereira G, Haggar F, Shand AW, Bower C, Cook A, Nassar N. Association between pre-eclampsia and locally derived traffic-related air pollution: a retrospective cohort study. *J Epidemiol Community Health.* 2012 Aug 9. [Epub ahead of print]
40. van den Hooven EH, Pierik FH, de Kluizenaar Y, Hofman A, van Ratingen SW, Zandveld PY, et al. 2012. Air Pollution Exposure and Markers of Placental Growth and Function: The Generation R Study. *Environ Health Perspect* :-.
<http://dx.doi.org/10.1289/ehp.1204918>
41. Bell ML, Belanger K, Ebisu K, Gent JF, Leaderer BP. Relationship between birth weight and exposure to airborne fine particulate potassium and titanium during gestation. *Environ Res.* 2012 Jun 15. [Epub ahead of print]
42. Shah PS, Balkhair T. Air pollution and birth outcomes: a systematic review. Knowledge Synthesis Group on Determinants of Preterm/LBW births. Collaborators: *Environ Int.* 2011 Feb;37(2):498-516. Epub 2010 Nov 26.

43. Shah PS, Ohlsson A, Shah V, Murphy KE, McDonald SD, Hutton E, Newburn-Cook C, Frick C, Scott F, Allen V, Beyene J, Stieb DM, Chen L, Eshoul M, Judek S. Ambient air pollution, birth weight and preterm birth: A systematic review and meta-analysis. *Environ Res.* 2012 Jun 20. [Epub ahead of print].
44. Parker JD, Rich DQ, Glinianaia SV, Leem JH, Wartenberg D, Bell ML, Bonzini M, Brauer M, Darrow L, Gehring U, Gouveia N, Grillo P, Ha E, van den Hooven EH, Jalaludin B, Jesdale BM, Lepeule J, Morello-Frosch R, Morgan GG, Slama R, Pierik FH, Pesatori AC, Sathyannarayana S, Seo J, Strickland M, Tamburic L, Woodruff TJ. The International Collaboration on Air Pollution and Pregnancy Outcomes: initial results. *Environ Health Perspect.* 2011 Jul;119(7):1023-8. Epub 2011 Feb 9.
45. Chang HH, Reich BJ, Miranda ML. Time-to-event analysis of fine particle air pollution and preterm birth: results from North Carolina, 2001-2005. *Am J Epidemiol.* 2012 Jan 15;175(2):91-8. Epub 2011 Dec 13.
46. Kessler R 2012. Followup in Southern California: Decreased Birth Weight following Prenatal Wildfire Smoke Exposure. *Environ Health Perspect* 120:a362-a362. <http://dx.doi.org/10.1289/ehp.120-a362b>
47. Kloog, I, SJ Melly, WL Ridgway, BA Coull and J Schwartz. 2012. Using new satellite based exposure methods to study the association between pregnancy pm2.5 exposure, premature birth and birth weight in Massachusetts. *Environmental Health* <http://dx.doi.org/10.1186/1476-069X-11-40>.
48. Padula AM, Mortimer K, Hubbard A, Lurmann F, Jerrett M, Tager IB. Exposure to Traffic-related Air Pollution During Pregnancy and Term Low Birth Weight: Estimation of Causal

Associations in a Semiparametric Model. Am J Epidemiol. 2012 Oct 7. [Epub ahead of print]

49. Backes CH, Nelin T, Gorr MW, Wold LE. Early Life Exposure to Air Pollution: How Bad Is It? Toxicol Lett. 2012 Nov 16. pii: S0378-4274(12)01380-X. doi: 10.1016/j.toxlet.2012.11.007. [Epub ahead of print]

50. Geer LA, Weedon J, Bell ML. Ambient air pollution and term birth weight in Texas from 1998 to 2004. J Air Waste Manag Assoc. 2012 Nov;62(11):1285-95.

51. Nieuwenhuijsen MJ, Dadvand P, Grellier J, Martinez D, Vrijheid M. Environmental risk factors of pregnancy outcomes: a summary of recent meta-analyses of epidemiological studies. Environ Health. 2013 Jan 15;12(1):6. [Epub ahead of print]

52. Olsson D, Forsberg M. Air pollution exposure in early pregnancy and adverse pregnancy outcomes: a register-based cohort study. BMJ Open, 2013; 3 (2): e001955 DOI: 10.1136/bmjopen-2012-001955

53. Dadvand P, Parker J, Bell ML, Bonzini M, Brauer M, Darrow L, Gehring U, Glinianaia SV, Gouveia N, Ha EH, Leem JH, van den Hooven EH, Jalaludin B, Jesdale BM, Lepeule J, Morello-Frosch R, Morgan GG, Pesatori AC, Pierik FH, Pless-Mulloli T, Rich DQ, Sathyarayana S, Seo J, Slama R, Strickland M, Tamburic L, Wartenberg D, Nieuwenhuijsen MJ, Woodruff TJ. Maternal Exposure to Particulate Air Pollution and Term Birth Weight: A Multi-Country Evaluation of Effect and Heterogeneity. Environ Health Perspect. 2012 Feb 6. [Epub ahead of print]

54. Warren JL, Fuentes M, Herring AH, Langlois PH. ISRN Obstet Gynecol. 2013;2013:387452. doi: 10.1155/2013/387452. Epub

2013 Jan 30. Air pollution metric analysis while determining susceptible periods of pregnancy for low birth weight.

55. Padula A, Tager I, Carmichael S, Hammond S, Lurmann F, Shaw G. The Association of Ambient Air Pollution and Traffic Exposures With Selected Congenital Anomalies in the San Joaquin Valley of California. *Am. J. Epidemiol.* (2013) doi: 10.1093/aje/kws367 First published online: March 28, 2013

56. Yorifuji T, Naruse H, Kashima S, Takao S, Murakoshi T, Doi H, Kawachi I. Residential proximity to major roads and adverse birth outcomes: a hospital-based study. *Environ Health.* 2013 Apr 18;12(1):34. [Epub ahead of print].

57. Mainolfi MB, Salihu HM, Wilson RE, Mbah AK. Low-Level Exposure to Air Pollution and Risk of Adverse Birth Outcomes in Hillsborough County, Florida. *J Occup Environ Med.* 2013 Apr 24. [Epub ahead of print]

58. Faiz AS, Rhoads GG, Demissie K, Lin Y, Kruse L, Rich DQ. Does Ambient Air Pollution Trigger Stillbirth? *Epidemiology.* 2013 May 14. [Epub ahead of print]

59. Dadvand P, Sunyer J, Basagaña X, Ballester F, Lertxundi A, Fernández-Somoano A, Estarlich M, García-Estebar R, Mendez MA, Nieuwenhuijsen NJ. 2012 Surrounding greenness and pregnancy outcomes in four Spanish birth cohorts. *Environmental Health Perspectives*
<http://dx.doi.org/10.1289/ehp.1205244>.

60. Xu X, Hu H, Ha S, Roth J. Ambient air pollution and hypertensive disorder of pregnancy. *J Epidemiol Community Health.* 2013 Sep 10. doi: 10.1136/jech-2013-202902. [Epub ahead of print]

61. Dadvand P, Figueras F, Basagaña X, Beelen R, Martinez D, Cirach M, Schembari A, Hoek G, Brunekreef B, Nieuwenhuijsen MJ. Ambient Air Pollution and Preeclampsia: A Spatiotemporal Analysis. *Environ Health Perspect*. 2013 Sep 10. [Epub ahead of print]
62. Pedersen M, et al. Ambient air pollution and low birthweight: a European cohort study (ESCAPE) *The Lancet Respiratory Medicine*, Early Online Publication, 15 October 2013
doi:10.1016/S2213-2600(13)70192-9
63. Candela S, Ranzi A, Bonvicini L, Baldacchini F, Marzaroli P, Evangelista A, Luberto F, Carretta E, Angelini P, Sterrantino AF, Broccoli S, Cordioli M, Ancona C, Forastiere F. Air pollution from incinerators and reproductive outcomes: a multisite study. *Epidemiology*. 2013 Nov;24(6):863-70. doi: 10.1097/EDE.0b013e3182a712f1.
64. Savitz D, et al. Ambient Fine Particulate Matter, Nitrogen Dioxide, and Term Birth Weight in New York, New York *Am. J. Epidemiol.* (2013) doi: 10.1093/aje/kwt268 First published online: November 10, 2013
65. Wylie BJ, Coull BA, Hamer DH, Singh MP, Jack D, Yeboah-Antwi K, Sabin L, Singh N, Macleod WB. Impact of biomass fuels on pregnancy outcomes in central East India. *Environ Health*. 2014 Jan 9;13(1):1. [Epub ahead of print]
66. Gianicolo EA¹, Mangia C², Cervino M³, Bruni A⁴, Andreassi MG⁵, Latini G⁶. Congenital anomalies among live births in a high environmental risk area-A case-control study in Brindisi (southern Italy). *Environ Res*. 2014 Jan;128:9-14. doi: 10.1016/j.envres.2013.11.002. Epub 2013 Dec 17.

67. McKenzie L, et al. Birth Outcomes and Maternal Residential Proximity to Natural Gas Development in Rural Colorado Environ Health Perspect; DOI:10.1289/ehp. 1306722
68. Gray S, Edwards S, Schultz B, and Miranda M. Assessing the impact of race, social factors and air pollution on birth outcomes: a population-based study. Environmental Health 2014, 13:4 doi:10.1186/1476-069X-13-4
69. Fleisch A, et al. Air Pollution Exposure and Abnormal Glucose Tolerance during Pregnancy: The Project Viva Cohort. Environ Health Perspect; DOI:10.1289/ehp. 1307065
70. Xu X, Hu H, Ha S, Roth J, Air pollution Ambient air pollution and hypertensive disorder of pregnancy. J Epidemiol Community Health 2014;68:13-20 doi:10.1136/ jech-2013-202902
71. Enkhmaa D, Warburton N, Javzandulam B, Uyanga J, Khishigsuren Y, Lodoysamba S, Enkhtur S, Warburton D. Seasonal ambient air pollution correlates strongly with spontaneous abortion in Mongolia. BMC Pregnancy Childbirth. 2014 Apr 23;14(1):146. [Epub ahead of print]
72. Stingone J. Maternal Exposure to Criteria Air Pollutants and Congenital Heart Defects in Offspring: Results from the National Birth Defects Prevention Study. Environ Health Perspect; DOI:10.1289/ehp.1307289
73. Hannam K, McNamee R, Baker P, Sibley C, Agius R. Air pollution exposure and adverse pregnancy outcomes in a large UK birth cohort: use of a novel spatio-temporal modelling technique. Scand J Work Environ Health. 2014 Mar 19. pii: 3423. doi: 10.5271/sjweh.3423. [Epub ahead of print]

74. Pedersen M, Stayner L, Slama R, Sørensen M, Figueras F, Nieuwenhuijsen MJ, Raaschou-Nielsen O, Dadvand P. Ambient Air Pollution and Pregnancy-Induced Hypertensive Disorders: A Systematic Review and Meta-Analysis. *Hypertension*. 2014 Jun 16. pii: HYPERTENSIONAHA.114.03545. [Epub ahead of print]
75. Dadvand P, Figueras F, Basagaña X, Beelen R, Martinez D, Cirach M, Schembari A, Hoek G, Brunekreef B, Nieuwenhuijsen MJ. Ambient air pollution and preeclampsia: a spatiotemporal analysis. *Environ Health Perspect*. 2013 Nov-Dec;121(11-12): 1365-71. doi: 10.1289/ehp.1206430. Ep
76. Hyder A, Lee HJ, Ebisu K, Koutrakis P, Belanger K, Bell ML. PM_{2.5} exposure and birth outcomes: use of satellite- and monitor-based data. *Epidemiology*. 2014 Jan; 25(1):58-67. doi: 10.1097/EDE.0000000000000027.
77. Stingone J. et al. Maternal Exposure to Criteria Air Pollutants and Congenital Heart Defects in Offspring: Results from the National Birth Defects Prevention Study. *Environ Health Perspect*; DOI:10.1289/ehp.1307289
78. Zhu X, Liu Y, Chen Y, Yao C, Che Z, Cao J. Maternal exposure to fine particulate matter (PM_{2.5}) and pregnancy outcomes: a meta-analysis. *Environ Sci Pollut Res Int*. 2014 Aug 28. [Epub ahead of print]
79. Rappazzo K, et al. Exposure to Fine Particulate Matter during Pregnancy and Risk of Preterm Birth among Women in New Jersey, Ohio, and Pennsylvania, 2000–2005. *Environ Health Perspect*; DOI:10.1289/ehp.1307456
80. Holstius DM, Reid CE, Jesdale BM, Morello-Frosch R. Birth weight following pregnancy during the 2003 Southern California

wildfires. Environ Health Perspect. 2012 Sep;120(9):1340-5. doi: 10.1289/ehp.1104515. Epub 2012 May 29.

81. Farhi A, Boyko V, Almagor J, Benenson I, Segre E, Rudich Y, Stern E, Lerner-Geva L. The possible association between exposure to air pollution and the risk for congenital malformations. Environ Res. 2014 Sep 29;135C:173-180. doi: 10.1016/j.envres.2014.08.024. [Epub ahead of print]

82. Kahn L. et al. Blood Lead Concentration and Thyroid Function during Pregnancy: Results from the Yugoslavia Prospective Study of Environmental Lead Exposure. Environ Health Perspect; DOI:10.1289/ehp.1307669

83. Ibrahimou B, Salihu HM, Aliyu MH, Anozie C. Risk of Preeclampsia From Exposure to Particulate Matter (PM_{2.5}) Speciation Chemicals During Pregnancy. J Occup Environ Med. 2014 Dec;56(12):1228-1234.

84. Porter TR, Kent ST, Su W, Beck HM, Gohlke JM. Spatiotemporal association between birth outcomes and coke production and steel making facilities in Alabama, USA: a cross-sectional study. Environ Health. 2014 Oct 23;13(1):85. [Epub ahead of print]

85. Valentino S, et al. Maternal exposure to diesel engine exhaust during pregnancy affects early embryo development in a rabbit model. Reprod Fertil Dev. 2014 Dec;27(1):152. doi: 10.1071/RDv27n1Ab120.

86. Yorifuji T, Naruse H, Kashima S, Murakoshi T, Doi H. Residential proximity to major roads and obstetrical complications. Sci Total Environ. 2014 Dec 2;508C:188-192. doi: 10.1016/j.scitotenv.2014.11.077. [Epub ahead of print]

87. Fleisch AF, Rifas-Shiman SL, Koutrakis P, Schwartz JD, Kloog I, Melly S, Coull BA, Zanobetti A, Gillman MW, Gold DR, Oken E. Prenatal Exposure to Traffic Pollution: Associations with Reduced Fetal Growth and Rapid Infant Weight Gain. *Epidemiology*. 2015 Jan;26(1):43-50.
88. Liang Z, Wu L, Fan L, Zhao Q. Ambient air pollution and birth defects in Haikou city, Hainan province. *BMC Pediatr*. 2014 Nov 22;14(1):283. [Epub ahead of print]
89. Nagiah S, Phulukdaree A, Naidoo D, Ramcharan K, Naidoo R, Moodley D, Chuturgoon A. Oxidative stress and air pollution exposure during pregnancy: A molecular assessment. *Hum Exp Toxicol*. 2014 Nov 17. pii: 0960327114559992. [Epub ahead of print]
90. Salam M, et al. "Birth Outcomes and Prenatal Exposure to Ozone, Carbon Monoxide and Particulate Matter: Results from the Children's Health Study, Environmental Health Perspectives. Vol. 113, No. 11, November 2005, pp. 1638-1644.
91. Hyunok Choi H, et al. Fetal Window of Vulnerability to Airborne Polycyclic Aromatic Hydrocarbons on Proportional Intrauterine Growth Restriction. *PLoS One*. 2012; 7(4): e35464. Published online Apr 24, 2012. doi: 10.1371/journal.pone.0035464
92. Zhao N, et al. Ambient air pollutant PM10 and risk of preterm birth in Lanzhou, China. *Environ Int*. 2014 Dec 29;76C:71-77. doi: 10.1016/j.envint.2014.12.009. [Epub ahead of print]
93. Dadvand P, et al. Air Pollution and Preterm Premature Rupture of Membranes: A Spatiotemporal Analysis. *Am J Epidemiol* January 15, 2014 179 (2) 200-207

94. Lin YT, Jung CR, Lee YL, Hwang BF. Associations Between Ozone and Preterm Birth in Women Who Develop Gestational Diabetes. *Am J Epidemiol.* 2015 Feb 3. pii: kwu264. [Epub ahead of print]
95. Hu H, Ha S, Henderson BH, Warner TD, Roth J, Kan H, Xu X. Association of Atmospheric Particulate Matter and Ozone with Gestational Diabetes Mellitus. *Environ Health Perspect.* 2015 Mar 20. [Epub ahead of print]
96. DeFranco E, et al. Air Pollution and Stillbirth Risk: Exposure to Airborne Particulate Matter during Pregnancy Is Associated with Fetal Death. *PLoS One.* 2015 Mar 20;10(3):e0120594. doi: 10.
97. Rappazzo KM, Daniels JL, Messer LC, Poole C, Lobdell DT. Exposure to Elemental Carbon, Organic Carbon, Nitrate, and Sulfate Fractions of Fine Particulate Matter and Risk of Preterm Birth in New Jersey, Ohio, and Pennsylvania (2000-2005). *Environ Health Perspect.* 2015 Apr 24. [Epub ahead of print]
98. Rich D, et al. Differences in Birth Weight Associated with the 2008 Beijing Olympic Air Pollution Reduction: Results from a Natural Experiment. *Environ Health Perspect;* DOI:10.1289/ehp.1408795
99. Schembari A, de Hoogh K, Pedersen M, Dadvand P, Martinez D, Hoek G, Petherick ES, Wright J, Nieuwenhuijsen MJ. Ambient Air Pollution and Newborn Size and Adiposity at Birth: Differences by Maternal Ethnicity (the Born in Bradford Study Cohort). *Environ Health Perspect.* 2015 May 15. [Epub ahead of print] *Environ Health Perspect.* 2015 May 15.

100. Pedersen M, et al. Elemental Constituents of Particulate Matter and Newborn's Size in Eight European Cohorts. *Environ Health Perspect*. 2015 Jun 5. [Epub ahead of print]
101. Hao Y, et al. Geographic Variation in the Association between Ambient Fine Particulate Matter (PM_{2.5}) and Term Low Birth Weight in the United States. *Environ Health Perspect*; DOI:10.1289/ehp.1408798
102. Iñiguez C, Esplugues A, Sunyer J, Basterrechea M, Fernández-Somoano A, Costa O, Estarlich M, Aguilera I, Lertxundi A, Tardón A, Guxens M, Murcia M, Lopez-Espinosa MJ, Ballester F. Prenatal Exposure to NO₂ and Ultrasound Measures of Fetal Growth in the Spanish INMA Cohort. *Environ Health Perspect*. 2015 Jun 26. [Epub ahead of print]
103. Sun X, et al. The association between fine particulate matter exposure during pregnancy and preterm birth: a meta-analysis. *BMC Pregnancy Childbirth*. 2015 Nov 18;15(1):300.
104. Zhu X, et al. Maternal exposure to fine particulate matter (PM_{2.5}) and pregnancy outcomes: a meta-analysis. *Environ Sci Pollut Res Int*. 2015 Mar;22(5):3383-96. doi: 10.1007/s11356-014-3458-7. Epub 2014 Aug 28.
105. Kassotis C, et al. Endocrine-Disrupting Activity of Hydraulic Fracturing Chemicals and Adverse Health Outcomes After Prenatal Exposure in Male Mice. *Environ Health Perspect*; DOI:10.1289/ehp.1409651
106. Hao H, et al. Air Pollution and Preterm Birth in the U.S. State of Georgia (2002–2006): Associations with Concentrations of 11 Ambient Air Pollutants Estimated by Combining Community Multiscale Air Quality Model (CMAQ) Simulations with Stationary

Monitor Measurements. Environ Health Perspect;
DOI:10.1289/ehp.1409651

107. Casey JA, Savitz DA, Rasmussen SG, Ogburn EL, Pollak J, Mercer DG, Schwartz BS. Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA. *Epidemiology*. 2015 Sep 30. [Epub ahead of print]

108. Liu C, et al. Different exposure levels of fine particulate matter and preterm birth: a meta-analysis based on cohort studies. *Environ Sci Pollut Res Int*. 2017 Jun 15. doi: 10.1007/s11356-017-9363-0. [Epub ahead of print]

109. Poirier A, Dodds L, Dummer T, Rainham D, Maguire B, Johnson M. Maternal Exposure to Air Pollution and Adverse Birth Outcomes in Halifax, Nova Scotia. *J Occup Environ Med*. 2015 Dec;57(12):1291-8. doi: 10.1097/JOM.0000000000000604.

110. Arroyo V, et al. Short term effect of air pollution, noise and heat waves on preterm births in Madrid (Spain). *Environmental Research*. Volume 145, February 2016, Pages 162–168.

111. Girguisa M, et al. Maternal exposure to traffic-related air pollution and birth defects in Massachusetts. *Environmental Research*. Volume 146, April 2016, Pages 1–9

112. Poursafa P, Baradaran-Mahdavi S, Moradi B, Haghjooy Javanmard S, Tajadini M, Mehrabian F, Kelishadi R. The relationship of exposure to air pollutants in pregnancy with surrogate markers of endothelial dysfunction in umbilical cord. *Environ Res*. 2016 Jan 4;146:154-160. doi: 10.1016/j.envres.2015.12.018. [Epub ahead of print]

113. Sun X, Luo X, Zhao C, Zhang B, Tao J, Yang Z, Ma W, Liu T. The associations between birth weight and exposure to fine particulate matter (PM_{2.5}) and its chemical constituents during pregnancy: A meta-analysis. *Environ Pollut.* 2015 Dec 28;211:38-47. doi: 10.1016/j.envpol.2015.12.022. [Epub ahead of print]
114. DeFranco E, et al. Exposure to airborne particulate matter during pregnancy is associated with preterm birth: a population-based cohort study. *Environ Health.* 2016 Jan 15;15(1):6. doi: 10.1186/s12940-016-0094-3.
115. Stieb D, et al. Associations of Pregnancy Outcomes and PM2.5 in a National Canadian Study. *Environ Health Perspect;* DOI:10.1289/ehp.1408995
116. Yongping H, et al. Geographic Variation in the Association between Ambient Fine Particulate Matter (PM2.5) and Term Low Birth Weight in the United States. *Environ Health Perspect;* DOI:10.1289/ehp.1408798
117. Lamichhane DK, Leem JH, Lee JY1, Kim HC. A meta-analysis of exposure to particulate matter and adverse birth outcomes. *Environ Health Toxicol.* 2015 Nov 3;30:e2015011. doi: 10.5620/eht.e2015011. eCollection 2015.
118. Rich D, et al. Differences in Birth Weight Associated with the 2008 Beijing Olympic Air Pollution Reduction: Results from a Natural Experiment. *Environ Health Perspect;* DOI:10.1289/ehp.1408795
119. Laurent O, et al. A Statewide Nested Case-Control Study of Preterm Birth and Air Pollution by Source and Composition:

California, 2001-2008. Environ Health Perspect. 2016 Feb 19. [Epub ahead of print]

120. Coker E, et al. Multi-pollutant exposure profiles associated with term low birth weight in Los Angeles County. Environ Int. 2016 Feb 15;91:1-13. doi: 10.1016/j.envint.2016.02.011. [Epub ahead of print]

121. Chen LY, et al. Incense Burning during Pregnancy and Birth Weight and Head Circumference among Term Births: The Taiwan Birth Cohort Study. Environ Health Perspect. 2016 Mar 11. [Epub ahead of print]

122. Erickson AC, et al. The reduction of birth weight by fine particulate matter and its modification by maternal and neighbourhood-level factors: a multilevel analysis in British Columbia, Canada. Environ Health. 2016 Apr 14;15(1):51. doi: 10.1186/s12940-016-0133-0.

123. Carvalho MA, et al. Associations of maternal personal exposure to air pollution on fetal weight and fetoplacental Doppler: a prospective cohort study. Reprod Toxicol. 2016 Apr 18. pii: S0890-6238(16)30063-6. doi: 10.1016/j.reprotox.2016.04.013. [Epub ahead of print]

124. Nachman RM, et al. Intrauterine Inflammation and Maternal Exposure to Ambient PM_{2.5} during Preconception and Specific Periods of Pregnancy: The Boston Birth Cohort. Environ Health Perspect. 2016 Apr 27. [Epub ahead of print]

125. Li S, Guo Y, Williams G. Acute Impact of Hourly Ambient Air Pollution on Preterm Birth. Environ Health Perspect. 2016 Apr 29. [Epub ahead of print]

126. Jiang M, et al. A nested case-control study of prenatal vanadium exposure and low birthweight. *Hum Reprod.* 2016 Jul 4. pii: dew176. [Epub ahead of print]
127. Rahman A, Kumarathasan P, Gomes J. Infant and mother related outcomes from exposure to metals with endocrine disrupting properties during pregnancy. *Sci Total Environ.* 2016 Jul 1. pii: S0048-9697(16)31309-2. doi: 10.1016/j.scitotenv.2016.06.134. [Epub ahead of print]
128. Hettfleisch K, et al. Short-Term Exposure to Urban Air Pollution and Influences on Placental Vascularization Indexes. *Environ Health Perspect.* 2016 Jul 6. [Epub ahead of print]
129. Clemente DBP, et al. Prenatal ambient air pollution, placental mitochondrial content, and birth weight in the INMA (Spain) and ENVIRONAGE (Belgium) birth cohorts. *Environ Health Perspect* 124(5):659–665 (2016), doi: 10.1289/ehp.1408981.
130. Siddika N, Balogun HA, Amegah AK, Jaakkola JJ. Prenatal ambient air pollution exposure and the risk of stillbirth: systematic review and meta-analysis of the empirical evidence. *Occup Environ Med.* 2016 May 24. pii: oemed-2015-103086. doi: 10.1136/oemed-2015-103086. [Epub ahead of print] Review.
131. Wylie B, et al. Placental Pathology Associated with Household Air Pollution in a Cohort of Pregnant Women from Dares Salaam, Tanzania. *Environ Health Perspect;* DOI:10.1289/EHP256
132. Laurent O, et al. A Statewide Nested Case-Control Study of Preterm Birth and Air Pollution by Source and Composition: California, 2001–2008. *Environ Health Perspect;* DOI:10.1289/ehp.1510133

133. Casey J, et al. Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA. *Epidemiology*. March 2016 - Volume 27 - Issue 2 - p 163–172
134. Liu Y, et al. Effect of Fine Particulate Matter (PM_{2.5}) on Rat Placenta Pathology and Perinatal Outcomes. *Med Sci Monit*. 2016 Sep 15;22:3274-80.
135. Li S, et al. Acute Impact of Hourly Ambient Air Pollution on Preterm Birth. *Environ Health Perspect*; DOI:10.1289/EHP200
136. Díaz J, Arroyo V, Ortiz C, Carmona R, Linares C. Effect of Environmental Factors on Low Weight in Non-Premature Births: A Time Series Analysis. *PLoS One*. 2016 Oct 27;11(10):e0164741
137. Saenen ND, et al. Lower Placental Leptin Promoter Methylation in Association with Fine Particulate Matter Air Pollution during Pregnancy and Placental Nitrosative Stress at Birth in the ENVIRONAGE Cohort. *Environ Health Perspect*; DOI:10.1289/EHP38
138. Avalos LA, Chen H, Li DK, Basu R. The impact of high apparent temperature on spontaneous preterm delivery: a case-crossover study. *Environmental Health*. 2017 Feb 1;16(1):5. doi: 10.1186/s12940-017-0209-5.
139. Jedrychowski WA, Majewska R, Spengler JD, Camann D, Roen EL, Perera FP. Prenatal exposure to fine particles and polycyclic aromatic hydrocarbons and birth outcomes: a two-pollutant approach. *Int Arch Occup Environ Health*. 2017 Feb 7. doi: 10.1007/s00420-016-1192-9. [Epub ahead of print]
140. Christopher S. Malley, Johan C.I. Kylenstierna, Harry W. Vallack, Daven K. Henze, Hannah Blencowe, Mike R. Ashmore.

Preterm birth associated with maternal fine particulate matter exposure: A global, regional and national assessment.

Environment International, 2017; DOI:

10.1016/j.envint.2017.01.023

141. Zhu Y, et al. Ambient air pollution and risk of gestational hypertension. Am J Epidemiol. 2017 May 4. doi: 10.1093/aje/kwx097. [Epub ahead of print]

142. Janssen BG, et al. Fetal Thyroid Function, Birth Weight, and in Utero Exposure to Fine Particle Air Pollution: A Birth Cohort Study. Environ Health Perspect; DOI:10.1289/EHP508

143. Basu R, et al. Association between PM_{2.5} and PM_{2.5} Constituents and Preterm Delivery in California, 2000-2006. Paediatr Perinat Epidemiol. 2017 Jul 21. doi: 10.1111/ppe.12380. [Epub ahead of print]

144. Clemens T, Turner S, Dibben C. Maternal exposure to ambient air pollution and fetal growth in North-East Scotland: A population-based study using routine ultrasound scans. Environ Int. 2017 Jul 25;107:216-226. doi: 10.1016/j.envint.2017.07.018. [Epub ahead of print]

145. Liu C, et al. Different exposure levels of fine particulate matter and preterm birth: a meta-analysis based on cohort studies. Environ Sci Pollut Res Int. 2017 Jun 15. doi: 10.1007/s11356-017-9363-0. [Epub ahead of print]

146. Mendola P, Ha S, Pollack AZ, Zhu Y, Seeni I, Kim SS, Sherman S, Liu D. Chronic and Acute Ozone Exposure in the Week Prior to Delivery Is Associated with the Risk of Stillbirth. Int J Environ Res Public Health. 2017 Jul 6;14(7). pii: E731. doi: 10.3390/ijerph14070731.

147. Wang L, et al. The association between cooking oil fume exposure during pregnancy and birth weight: A prospective mother-child cohort study. *Sci Total Environ.* 2017 Sep 4;612:822-830. doi: 10.1016/j.scitotenv.2017.08.031. [Epub ahead of print]
148. Clemens T, et al. Maternal exposure to ambient air pollution and fetal growth in North-East Scotland: A population-based study using routine ultrasound scans. *Environ Int.* 2017 Oct;107:216-226. doi: 10.1016/j.envint.2017.07.018. Epub 2017 Jul 25.
149. Reis MMD, et al. Air pollution and low birth weight in an industrialized city in Southeastern Brazil, 2003-2006. *Rev Bras Epidemiol.* 2017 Apr-Jun;20(2):189-199. doi: 10.1590/1980-5497201700020001.
150. Soto SF, et al. Exposure to fine particulate matter in the air alters placental structure and the renin-angiotensin system. *PLoS One.* 2017 Aug 18;12(8):e0183314. doi: 10.1371/journal.pone.0183314. eCollection 2017.
151. Blum J, et al. Exposure to Ambient Particulate Matter during Specific Gestational Periods Produces Adverse Obstetric Consequences in Mice. *Environmental Health Perspectives*, July 2017 DOI: 10.1289/EHP1029
152. Smith R, et al. Impact of London's road traffic air and noise pollution on birth weight: retrospective population based cohort study. *BMJ*, 2017; j5299 DOI: 10.1136/bmj.j5299
153. Dutta A, et al. Household air pollution and chronic hypoxia in the placenta of pregnant Nigerian women: A randomized controlled ethanol Cookstove intervention. *Sci Total Environ.*

2017 Nov 14;619-620:212-220. doi:
10.1016/j.scitotenv.2017.11.091. [Epub ahead of print]

154. Ji Y, et al. Association between exposure to particulate matter during pregnancy and birthweight: a systematic review and a meta-analysis of birth cohort studies. *J Biomed Res.* 2017 Nov 1. doi: 10.7555/JBR.31.20170038. [Epub ahead of print]
155. Wu H, et al. Exposure to fine particulate matter during pregnancy and risk of term low birth weight in Jinan, China, 2014-2016. *Int J Hyg Environ Health.* 2017 Oct 28. pii: S1438-4639(17)30399-1. doi: 10.1016/j.ijheh.2017.10.013. [Epub ahead of print]
156. Yang M, et al. The Impact of Environmental Regulation on Fetal Health: Evidence from the Shutdown of a Coal-Fired Power Plant Located Upwind of New Jersey. *Journal of Environmental Economics and Management,* 2017; DOI: 10.1016/j.jeem.2017.11.005
157. Ghasemi-Tehrani H, et al. Effect of Exposure to Air Pollution on Placental Weight in Isfahan-Iran. *J Family Reprod Health.* 2017 Jun;11(2):90-96.
158. Wang YY, et al. Association of Long-term Exposure to Airborne Particulate Matter of 1 μm or Less With Preterm Birth in China. *JAMA Pediatr.* 2018 Jan 2:e174872. doi: 10.1001/jamapediatrics.2017.4872. [Epub ahead of print]
159. Whitworth KW, et al. Drilling and Production Activity Related to Unconventional Gas Development and Severity of Preterm Birth. *Environ Health Perspect;* DOI:10.1289/EHP2622

160. Wang Q, et al. Effects of prenatal exposure to air pollution on preeclampsia in Shenzhen, China. *Environ Pollut.* 2018 Feb 18;237:18-27. doi: 10.1016/j.envpol.2018.02.010. [Epub ahead of print]
161. Ren Z, et al. Maternal exposure to ambient PM10 during pregnancy increases the risk of congenital heart defects: Evidence from machine learning models. *Sci Total Environ.* 2018 Feb 19;630:1-10. doi: 10.1016/j.scitotenv.2018.02.181. [Epub ahead of print]
162. Yang S, Tan Y, Mei H, Wang F, Li N, Zhao J, Zhang Y, Qian Z, Chang JJ, Syberg KM, Peng A, Mei H, Zhang D, Zhang Y, Xu S, Li Y, Zheng T, Zhang B. Ambient air pollution the risk of stillbirth: A prospective birth cohort study in Wuhan, China. *Int J Hyg Environ Health.* 2018 Feb 5. pii: S1438-4639(17)30531-X. doi: 10.1016/j.ijheh.2018.01.014. [Epub ahead of print] PMID: 29422441 [PubMed - as supplied by publisher]
163. Li X, et al. Analysis of short-term and sub-chronic effects of ambient air pollution on preterm birth in central China. *Environ Sci Pollut Res Int.* 2018 May 2. doi: 10.1007/s11356-018-2061-8. [Epub ahead of print]
164. Casey JA, et al. Coal and oil power plant retirements in California associated with reduced preterm birth among populations nearby. *American Journal of Epidemiology*, kwy110, <https://doi.org/10.1093/aje/kwy110>. Published: 16 May 2018
165. Casey JA, et al. Increase in fertility following coal and oil power plant retirements in California. *Environ Health.* 2018 May 2;17(1):44. doi: 10.1186/s12940-018-0388-8.

166. Xue T, et al. Association Between Hypertensive Disorders in Pregnancy and Particulate Matter in the Contiguous United States, 1999-2004. *Hypertension*. 2018 May 21. pii: HYPERTENSIONAHA.118.11080. doi: 10.1161/HYPERTENSIONAHA.118.11080. [Epub ahead of print].
167. Grippo A, et al. Air pollution exposure during pregnancy and spontaneous abortion and stillbirth. *Rev Environ Health*. 2018 Jul 5. pii: /j/reveh.ahead-of-print/reveh-2017-0033/reveh-2017-0033.xml. doi: 10.1515/reveh-2017-0033. [Epub ahead of print]
168. Gong X et al. Associations between maternal residential proximity to air emissions from industrial facilities and low birth weight in Texas, USA. *Environ Int*. 2018 Aug 7;120:181-198. doi: 10.1016/j.envint.2018.07.045. [Epub ahead of print]
169. Wang L, et al. Association between early prenatal exposure to ambient air pollution and birth defects: evidence from newborns in Xi'an, China. *J Public Health (Oxf)*. 2018 Aug 18. doi: 10.1093/pubmed/fdy137. [Epub ahead of print]
170. He T, et al. Ambient air pollution, H19/DMR methylation in cord blood and newborn size: A pilot study in Zhengzhou City, China. *Chemosphere*. 2018 Aug 30;212:863-871. doi: 10.1016/j.chemosphere.2018.08.140. [Epub ahead of print]
171. Barn P, et al. The effect of portable HEPA filter air cleaner use during pregnancy on fetal growth: The UGAAR randomized controlled trial. *Environ Int*. 2018 Sep 10. pii: S0160-4120(18)31141-3. doi: 10.1016/j.envint.2018.08.036. [Epub ahead of print]

172. Wang Q, et al. Identifying windows of susceptibility for maternal exposure to ambient air pollution and preterm birth. *Environ Int.* 2018 Sep 18;121(Pt 1):317-324. doi: 10.1016/j.envint.2018.09.021. [Epub ahead of print]
173. Liu WY, et al. Association between ambient air pollutants and preterm birth in Ningbo, China: a time-series study. *BMC Pediatr.* 2018 Sep 20;18(1):305. doi: 10.1186/s12887-018-1282-9.
174. Arinola GO, et al. Household Air Pollution, Levels of Micronutrients and Heavy Metals in Cord and Maternal Blood, and Pregnancy Outcomes. *Int J Environ Res Public Health.* 2018 Dec 17;15(12). pii: E2891. doi: 10.3390/ijerph15122891.
175. Norlén F, et al. Occupational exposure to inorganic particles during pregnancy and birth outcomes: a nationwide cohort study in Sweden. *BMJ Open.* 2019 Feb 27;9(2):e023879. doi: 10.1136/bmjopen-2018-023879.
176. Li R, et al. Term birth weight and ambient air pollutant concentrations during pregnancy, among women living in Monroe County, New York. *J Expo Sci Environ Epidemiol.* 2019 Apr 2. doi: 10.1038/s41370-019-0131-8. [Epub ahead of print]
177. Franklin P, et al. Maternal Exposure to Indoor Air Pollution and Birth Outcomes. *Int J Environ Res Public Health.* 2019 Apr 16;16(8). pii: E1364. doi: 10.3390/ijerph16081364.
178. Gaskins AJ, et al. Exposure to Traffic-Related Air Pollution, Supplemental Folate Intake, and Live Birth Among Women Undergoing Assisted Reproduction. *Am J Epidemiol.* 2019 Jun 26. pii: kwz151. doi: 10.1093/aje/kwz151. [Epub ahead of print]

179. McKenzie LM, et al. Congenital heart defects and intensity of oil and gas well site activities in early pregnancy. *Environment International*, 2019; 104949 DOI: 10.1016/j.envint.2019.104949
180. Fong KC, et al. Relative toxicities of major particulate matter constituents on birthweight in Massachusetts. *Environ Epidemiol*. 2019 Jun 19;3(3):e047. doi: 10.1097/EE9.0000000000000047. eCollection 2019 Jun.
181. Smith RB, et al. *Environ Int*. 2019 Nov 26;134:105290. doi: 10.1016/j.envint.2019.105290. [Epub ahead of print] Impacts of air pollution and noise on risk of preterm birth and stillbirth in London
182. Wang K, et al. Maternal exposure to ambient fine particulate matter and risk of premature rupture of membranes in Wuhan, Central China: a cohort study. *Environ Health* . 2019 Nov 14;18(1):96. doi: 10.1186/s12940-019-0534-y.
183. Sun M, et al. The correlation between PM_{2.5} exposure and hypertensive disorders in pregnancy: A Meta-analysis. *Sci Total Environ*. 2019 Nov 2;703:134985. doi: 10.1016/j.scitotenv.2019.134985. [Epub ahead of print]
184. Qiao P, et al. Twin growth discordance in association with maternal exposure to fine particulate matter and its chemical constituents during late pregnancy. *Environ Int*. 2019 Sep 10;133(Pt A):105148. doi: 10.1016/j.envint.2019.105148. [Epub ahead of print].
185. Liu X, et al. Effects of prenatal exposure to air particulate matter on the risk of preterm birth and roles of maternal and cord blood LINE-1 methylation: A birth cohort study in Guangzhou,

China. Environ Int. 2019 Oct 14;133(Pt A):105177. doi: 10.1016/j.envint.2019.105177. [Epub ahead of print]

186. Hu CY, et al. Human epidemiological evidence about the association between air pollution exposure and gestational diabetes mellitus: Systematic review and meta-analysis. Environ Res. 2019 Oct 21;180:108843. doi: 10.1016/j.envres.2019.108843. [Epub ahead of print]

187. Smith RB, et al. Impacts of air pollution and noise on risk of preterm birth and stillbirth in London. Environ Int. 2019 Nov 26;134:105290. doi: 10.1016/j.envint.2019.105290. [Epub ahead of print]

188. Rosofsky AS, et al. Prenatal Ambient Particulate Matter Exposure and Longitudinal Weight Growth Trajectories in Early Childhood. Int J Environ Res Public Health. 2020 Feb 24;17(4). pii: E1444. doi: 10.3390/ijerph17041444.

189. Zhang X, et al. Maternal PM_{2.5} exposure triggers preterm birth: a cross-sectional study in Wuhan, China. Glob Health Res Policy. 2020 May 1;5:17. doi: 10.1186/s41256-020-00144-5. eCollection 2020.

190. Tran K, et al. Residential Proximity to Oil and Gas Development and Birth Outcomes in California: A Retrospective Cohort Study of 2006–2015 Births. Environmental Health Perspectives, 2020; 128 (6): 067001 DOI: 10.1289/EHP5842

191. Sarizadeh R, Dastoorpoor M, Goudarzi G, Simbar M. The Association Between Air Pollution and Low Birth Weight and Preterm Labor in Ahvaz, Iran. Int J Womens Health. 2020 May 4;12:313-325. doi: 10.2147/IJWH.S227049. eCollection 2020. PMID: 32440227 [Pub

192. Fong KC, Shi L, Papatheodorou S, Di Q, Just A, Kosheleva A, Messerlian C, Schwartz JD. Prenatal exposure to particulate air pollution and gestational age at delivery in Massachusetts neonates 2001-2015: A perspective of causal modeling and health disparities. *Environ Epidemiol.* 2020 Sep 14;4(5):e113. doi: 10.1097/EE9.000000000000113. eCollection 2020 Oct. PMID: 33154990 Free PMC article.
193. Zanini MJ, et al. Urban-Related Environmental Exposures during Pregnancy and Placental Development and Preeclampsia: a Review. *Curr Hypertens Rep.* 2020 Sep 3;22(10):81. doi: 10.1007/s11906-020-01088-4. PMID: 32880755 Review
194. Willis M, et al. Associations between Residential Proximity to Oil and Gas Drilling and Term Birth Weight and Small-for-Gestational-Age Infants in Texas: A Difference-in-Differences Analysis. *Environmental Health Perspectives*, 2021; 129 (7): 077002 DOI: 10.1289/EHP7678
195. Jiajianghui Li, Tianjia Guan, Qian Guo, Guannan Geng, Huiyu Wang, Fuyu Guo, Jiwei Li, Tao Xue. Exposure to landscape fire smoke reduced birthweight in low- and middle-income countries: findings from a siblings-matched case-control study. *eLife*, 2021; 10 DOI: 10.7554/eLife.69298
196. Howe C, et al. Prenatal metal(lloid) mixtures and birth weight for gestational age: A pooled analysis of three cohorts participating in the ECHO program. *Environment International*, 2022; 161: 107102 DOI: 10.1016/j.envint.2022.107102
197. Qiu X, Fong KC, Shi L, Papatheodorou S, Di Q, Just A, Kosheleva A, Messerlian C, Schwartz JD. Prenatal exposure to particulate air pollution and gestational age at delivery in Massachusetts neonates 2001-2015: A perspective of causal

modeling and health disparities. Environ Epidemiol. 2020 Sep 14;4(5):e113. doi: 10.1097/EE9.0000000000000113

198. Zhou W, et al. Association between Maternal Exposure to Ambient Air Pollution and the Risk of Preterm Birth: A Birth Cohort Study in Chongqing, China, 2015-2020. Int J Environ Res Public Health. 2022 Feb 15;19(4):2211. doi: 10.3390/ijerph19042211.

199. Zhang B, et al. Ambient PM2.5 exposures and systemic inflammation in women with early pregnancy. Sci Total Environ. 2022 Mar 14:154564. doi: 10.1016/j.scitotenv.2022.154564

200. Yu Z, Zhang X, Zhang J, Feng Y, Zhang H, Wan Z, Xiao C, Zhang H, Wang Q, Huang C. Gestational exposure to ambient particulate matter and preterm birth: An updated systematic review and meta-analysis. Environ Res. 2022 May 3:113381. doi: 10.1016/j.envres.2022.113381. Epub ahead of print. PMID: 35523275.

201. Zhou W, Ming X, Chen Q, Liu X, Yin P. The acute effect and lag effect analysis between exposures to ambient air pollutants and spontaneous abortion: a case-crossover study in China, 2017-2019. Environ Sci Pollut Res Int. 2022 May 6. doi: 10.1007/s11356-022-20379-8. Epub ahead of print. PMID: 35522417.

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Pollution and the Lung

- * Air pollution permanently inhibits lung growth in children. In fact prenatal exposure can reduce fetal lung development, impairing lung function in childhood and permanently reducing the number of alveoli (air sacs) in the lungs.
- * Brief exposure to ozone and particulate matter reduce lung function even in young healthy adults and the reduction can last for a week after the pollution exposure is over.
- * Air pollution causes lung cancer.
- * Long term ozone exposure causes an increase in overall mortality in addition to that from particulate matter. Most of the mortality is respiratory.
 - * Long term exposure to even small increases in ozone cause as much emphysematous destruction of lung tissue and function as 29 years of cigarette smoking a pack a day
- * Air pollution causes, complicates, or exacerbates virtually all pulmonary diseases, from mild reactive airways disease to fatal pulmonary fibrosis.
- * Air pollution is associated with increased rates of serious lower respiratory infections, and hospitalization and death from most respiratory diseases from neonates to the elderly.

*** The correlation between the above health outcomes and ozone are still found at concentrations between one half and one third the current EPA NAAQS.**

***Air pollution causes DNA damage and cell death to lung cells.**

***Wildfire smoke maybe ten times more toxic to the lung than other sources of particulate pollution.**

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1. Schelegle, E., Morales, C., Walby, W., et al, 6.6 Hour Inhalation of Ozone Concentrations from 60 to 87 Parts per Billion in Healthy Humans. American Journal of Respiratory and Critical Care Medicine Vol 180. pp 265-272, (2009).

2. Thaller, E., Petronella, S., Hochman, D. et al. Moderate increases in Ambient PM 2.5 and Ozone Are Associated With Lung Function Decreases in Beach Lifeguards. Journal of Occupational and Environmental Medicine. 50(2):202-211, Feb. 2008.

3. Gauderman WJ, Gilliland GF, Vora H, et al. Association between Air Pollution and Lung Function Growth in Southern California Children: results from a second cohort. Am J Respir Crit Care Med 2002;166:76-84.

4. Gauderman WJ, Gilliland GF, Vora H, et al. The effect of air pollution on lung development from 10 to 18 years of age. NEJM 2004;351:1057-67.

5. Wichmann et al. Increased asthma and respiratory symptoms in children exposed to petrochemical pollution. *Journal of Allergy and Clinical Immunology*, 2009; 123 (3): 632 DOI: 10.1016/j.jaci.2008.09.052
6. Jerrett M, Burnett R, Pope CA, et al. Long-Term Ozone Exposure and Mortality. *NEJM*. Vol. 360:1085-1095. March 12, 2009 Num 11.
7. Zuurbier M, Hoek G, Oldenwening M, Meliefste K, van den Hazel P, Brunekreef B. Respiratory Effects of Commuters' Exposure to Air Pollution in Traffic. *Epidemiology*. 2011 Jan 11. [Epub ahead of print]
8. Faustini A, Stafoggia M, Berti G, Bisanti L, Chiusolo M, Cerniglio A, Mallone S, Primerano R, Scarnato C, Simonato L, Vigotti MA, Forastiere F; The relationship between ambient particulate matter and respiratory mortality: a multi-city study in Italy. *Eur Respir J*. 2011 Jan 13. [Epub ahead of print]
9. Forbes LJ, Kapetanakis V, Rudnicka AR, Cook DG, Bush T, Stedman JR, Whincup PH, Strachan DP, Anderson HR. Chronic exposure to outdoor air pollution and lung function in adults. *Thorax*. 2009 Aug;64(8):657-63. Epub 2009 Apr 8.
10. Chong S Kim^{1*}, Neil E Alexis², Ana G Rappold¹, Howard Kehrl¹, Milan J Hazucha², John C Lay², Mike T Schmitt¹, Martin Case¹, Robert B Devlin¹, David B Peden², and David Diaz-Sanchez¹ Lung Function and Inflammatory Responses in Healthy Young Adults Exposed to 0.06 ppm Ozone for 6.6 Hours. Published ahead of print on January 7, 2011. *Am. J. Respir. Crit. Care Med.* 2011, doi:10.1164/rccm.201011-1813OC

11. Steinvil A, Fireman E, Kordova-Biezuner L, Cohen M, Shapira I, Berliner S, Rogowski O. Environmental air pollution has decremental effects on pulmonary function test parameters up to one week after exposure. *Am J Med Sci.* 2009 Oct; 338(4):273-9.
12. Karr CJ, Demers P, Koehoorn M, Lencar C, Tamburic L, Brauer M. Influence of Ambient Air Pollutant Sources on Clinical Encounters for Infant Bronchiolitis. *Am. J. Respir. Crit. Care Med.*, Nov 2009; 180: 995 - 1001.
13. Hollingsworth, J.W. et al. (2007) Ozone and pulmonary innate immunity. *Proc. Am. Thorac. Soc.* 4, 240–246
14. Strickland M, Darrow L, et al. Short Term Associations between Ambient Air Pollutants and Pediatric Asthma Emergency Department Visits. *Am J Respir Crit Care Med* Vol 182 pp307-316, 2010
15. Stafoggia M, Forastiere F, et al. Susceptibility Factors to Ozone Related Mortality *Am J Respir Crit Care Med* Vol 182 pp 376-384, 2010
16. Bell ML, Peng RD, Dominici F. The exposure-response curve for ozone and risk of mortality and the adequacy of current ozone regulations. *Environ Health Perspect* 2006;114:532-536.
17. Mushtaq N, Ezzati M, Hall L, Dickson I, Kirwan M, Png KM, Mudway IS, Grigg J. Adhesion of *Streptococcus pneumoniae* to human airway epithelial cells exposed to urban particulate matter. *J Allergy Clin Immunol.* 2011 Jan 17. [Epub ahead of print]
18. Andersen Z, Hvidberg M, Jensen S, et al. Chronic Obstructive Pulmonary Disease and Long-Term Exposure to Traffic-Related Air Pollution: A Cohort Study. *Am. J. Respir. Crit. Care Med.*

2010, doi:10.1164/rccm.201006-0937OC. Published ahead of print on September 24, 2010

19. Raaschou-Nielsen O, Andersen Z, Hvidberg M, Jensen SS, Ketzel M, Sørensen M, et al. 2011. Lung Cancer Incidence and Long-Term Exposure to Air Pollution from Traffic. *Environ Health Perspect* :- doi:10.1289/ehp.1002353
20. Spira-Cohen A, Chen L-C, Kendall M, Lall R, Thurston GD 2011. Personal Exposures to Traffic-Related Air Pollution and Acute Respiratory Health Among Bronx School Children with Asthma. *Environ Health Perspect* :- doi:10.1289/ehp.1002653
21. Franck U, Herbarth O, Röder S, Schlink U, Borte M, Diez U, Krämer U, Lehmann I. Respiratory effects of indoor particles in young children are size dependent. *Sci Total Environ.* 2011 Feb 10. [Epub ahead of print]
22. Minelli C, Wei I, Sagoo G, Jarvis D, Shaheen S, Burney P. Interactive Effects of Antioxidant Genes and Air Pollution on Respiratory Function and Airway Disease: A Huge Review. *Am J Epidemiol.* 2011 Feb 22. [Epub ahead of print].
23. N. Li, J. R. Harkema, R. P. Lewandowski, M. Wang, L. A. Bramble, G. R. Gookin, Z. Ning, M. T. Kleinman, C. Sioutas, A. E. Nel. Ambient Ultrafine Particles Provide a Strong Adjuvant Effect in the Secondary Immune Response: Implication for Traffic-related Asthma Flares. *AJP: Lung Cellular and Molecular Physiology*, 2010; DOI: 10.1152/ajplung.00115.2010
24. Nawrot TS, Vos R, Jacobs L, Verleden SE, Wauters S, Mertens V, Dooms C, Hoet PH, Van Raemdonck DE, Faes C, Dupont LJ, Nemery B, Verleden GM, Vanaudenaerde BM. The impact of traffic air pollution on bronchiolitis obliterans syndrome

and mortality after lung transplantation. *Thorax*. 2011 Mar 23. [Epub ahead of print]

25. Son J-Y, Bell ML, Lee J-T 2011. Survival Analysis of Long-Term Exposure to Different Sizes of Airborne Particulate Matter and Risk of Infant Mortality Using a Birth Cohort in Seoul, Korea. *Environ Health Perspect* 119:725-730. doi:10.1289/ehp.1002364
26. Zuurbier, M, G Hoek, M Oldenwening, K Meliefste, P van den Hazel and B Brunekreef. 2011. Respiratory effects of commuters' exposure to air pollution in traffic. *Epidemiology* <http://dx.doi.org/10.1097/EDE.0b013e3182093693>.
27. Factor P, Akhmedov AT, McDonald JD, Qu A, Wu J, Jiang H, Dasgupta T, Panettieri Jr RA, Perera F, Miller RL. Polycyclic Aromatic Hydrocarbons Impair β 2AR Function in Airway Epithelial and Smooth Muscle Cells. *Am J Respir Cell Mol Biol*. 2011 May 26. [Epub ahead of print]
28. Pope CA 3rd, Burnett RT, Turner MC, Cohen AJ, Krewski D, Jerrett M, Gapstur SM, Thun MJ. Lung Cancer and Cardiovascular Disease Mortality Associated with Ambient Air Pollution and Cigarette Smoke: Shape of the Exposure-Response Relationships. *Environ Health Perspect*. 2011 Jul 19. [Epub ahead of print]
29. Peters S, Kromhout H, Olsson AC, Wichmann HE, Brüske I, Consonni D, Landi MT, Caporaso N, Siemiatycki J, Richiardi L, Mirabelli D, Simonato L, Gustavsson P, Plato N, Jöckel KH, Ahrens W, Pohlabeln H, Boffetta P, Brennan P, Zaridze D, Cassidy A, Lissowska J, Szeszenia-Dabrowska N, Rudnai P, Fabianova E, Forastiere F, Bencko V, Foretova L, Janout V, Stücker I, Dumitru RS, Benhamou S, Bueno-de-Mesquita B, Kendzia B, Pesch B,

Straif K, Brüning T, Vermeulen R. Occupational exposure to organic dust increases lung cancer risk in the general population. *Thorax*. 2011 Aug 19. [Epub ahead of print]

30. Peel JL, Klein M, Flanders WD, Mulholland JA, Freed G, Tolbert PE 2011. Ambient Air Pollution and Apnea and Bradycardia in High-Risk Infants on Home Monitors. *Environ Health Perspect* 119:1321-1327.

<http://dx.doi.org/10.1289/ehp.1002739>

31. Chiusolo M, Cadum E, Stafoggia M, Galassi C, Berti G, Faustini A, et al. 2011. Short-Term Effects of Nitrogen Dioxide on Mortality and Susceptibility Factors in 10 Italian Cities: The EpiAir Study. *Environ Health Perspect* 119:1233-1238. <http://dx.doi.org/10.1289/ehp.1002904>

32. Andersen ZJ, Bønnelykke K, Hvidberg M, Jensen SS, Ketzel M, Loft S, Sørensen M, Tjønneland A, Overvad K, Raaschou-Nielsen O. Long-term exposure to air pollution and asthma hospitalisations in older adults: a cohort study. *Thorax*. 2011 Sep 2. [Epub ahead of print]

33. Esplugues A, Ballester F, Estarlich M, Llop S, Fuentes-Leonarte V, Mantilla E, Vioque J, Iñiguez Outdoor, but not indoor, nitrogen dioxide exposure is associated with persistent cough during the first year of life. *C.Sci Total Environ*. 2011 Sep 1. [Epub ahead of print]

34. Franzi LM, Bratt JM, Williams KM, Last JA. Why is particulate matter produced by wildfires toxic to lung macrophages? *Toxicol Appl Pharmacol*. 2011 Sep 16. [Epub ahead of print].

35. Turner MC, Krewski D, Pope III CA, Chen Y, Gapstur SM, Thun MJ. Long-Term Ambient Fine Particulate Matter Air Pollution

and Lung Cancer in a Large Cohort of Never Smokers. *Am J Respir Crit Care Med.* 2011 Oct 6. [Epub ahead of print]

36. Kim J, Natarajan S, Vaickus LJ, Bouchard JC, Beal D, Cruikshank WW, Remick DG. Diesel Exhaust Particulates Exacerbate Asthmalike Inflammation by Increasing CXC Chemokines. *Am J Pathol.* 2011 Sep 30. [Epub ahead of print]

37. Chang YK, Wu CC, Lee LT, Lin RS, Yu YH, Chen YC. The short-term effects of air pollution on adolescent lung function in Taiwan. *Chemosphere.* 2011 Dec 19. [Epub ahead of print]

38. Bernstein DI. Traffic-Related Pollutants and Wheezing in Children. *J Asthma.* 2012 Jan 3. [Epub ahead of print]

39. Ghosh R, Joad J, Benes I, Dostal M, Sram RJ, Hertz-Pannier I. Ambient nitrogen oxides exposure and early childhood respiratory illnesses. *Environ Int.* 2012 Feb;39(1): 96-102. Epub 2011 Nov 11.

40. Brandt SJ, Perez L, Künzli N, Lurmann F, McConnell R. Costs of childhood asthma due to traffic-related pollution in two California communities. *Eur Respir J.* 2012 Jan 26. [Epub ahead of print]

41. Yi S, Zhang F, Qu F, Ding W. Water-insoluble fraction of airborne particulate matter (PM₁₀) induces oxidative stress in human lung epithelial A549 cells. *Environ Toxicol.* 2012 Feb 13. doi: 10.1002/tox.21750. [Epub ahead of print]

42. Liu X, Lessner L, Carpenter DO. Association between Residential Proximity to Fuel-Fired Power Plants and Hospitalization Rate for Respiratory Diseases. *Environ Health Perspect.* 2012 Feb 27. [Epub ahead of print]

43. Chan J, Fanucchi M, Anderson D, et al. Susceptibility of Inhaled Flame- Generated Ultrafine Soot in Neonatal and Adult Rat Lungs. *Toxicological Sciences*. **124**:472-486.
doi:10.1093/toxsci/kfr233
44. Cornell A, Chillrud S, Mellins R, et al. Domestic airborne black carbon and exhaled nitric oxide in children in NYC. *Journal of Exposure Science and Environmental Epidemiology*, 2012; DOI: 10.1038/jes.2012.3
45. Canova C, Dunster C, Kelly FJ, Minelli C, Shah PL, Caneja C, Tumilty MK, Burney P. PM10-induced Hospital Admissions for Asthma and Chronic Obstructive Pulmonary Disease: The Modifying Effect of Individual Characteristics. *Epidemiology*. 2012 Apr 23. [Epub ahead of print]
46. Strak M, Janssen NA, Godri KJ, Gosens I, Mudway IS, Cassee FR, Lebret E, Kelly FJ, Harrison RM, Brunekreef B, Steenhof M, Hoek G. Respiratory Health Effects of Airborne Particulate Matter: The Role of Particle Size, Composition and Oxidative Potential - The RAPTES Project. *Environ Health Perspect*. 2012 May 2. [Epub ahead of print]
47. Brown MS, Sarnat SE, Demuth KA, Brown LA, Whitlock DR, Brown SW, Tolbert PE, Fitzpatrick AM. Residential proximity to a major roadway is associated with features of asthma control in children. *PLoS One*. 2012;7(5):e37044. Epub 2012 May 17.
48. Lin S, Jones R, Pantea C, Ozkaynak H, Rao ST, Hwang SA, Garcia VC. Impact of NO(x) emissions reduction policy on hospitalizations for respiratory disease in New York State. *J Expo Sci Environ Epidemiol*. 2012 Jul 25. doi: 10.1038/jes.2012.69. [Epub ahead of print]

49. Svendsen ER, Gonzales M, Mukerjee S, Smith L, Ross M, Walsh D, Rhoney S, Andrews G, Ozkaynak H, Neas LM. GIS-Modeled Indicators of Traffic-Related Air Pollutants and Adverse Pulmonary Health Among Children in El Paso, Texas. *Am J Epidemiol.* 2012 Oct 1;176 Suppl 7:S131-41. doi: 10.1093/aje/kws274.
50. Lin, S, R Jones, C Pantea, H Ozkaynak, ST Rao, S Hwang and VC Garcia. 2012. Impact of NOx emissions reduction policy on hospitalizations for respiratory disease in New York State. *Journal of Exposure Science and Environmental Epidemiology* [http:// dx.doi.org/10.1038/jes.2012.69](http://dx.doi.org/10.1038/jes.2012.69).
51. Kyung SY, Yoon JY, Kim YJ, Lee SP, Park JW, Jeong SH. Asian Dust Particles Induce TGF- β (1) via Reactive Oxygen Species in Bronchial Epithelial Cells. *Tuberc. Respir Dis (Seoul)*. 2012 Aug;73(2):84-92. doi: 10.4046/trd.2012.73.2.84. Epub 2012 Aug 31.
52. Zhu R, Chen Y, Wu S, Deng F, Liu Y, Yao W. The Relationship between Particulate Matter (PM(10)) and Hospitalizations and Mortality Of Chronic Obstructive Pulmonary Disease: A Meta-Analysis. *COPD*. 2013 Jan 16. [Epub ahead of print]
53. Kim BJ, Seo JH, Jung YH, Kim HY, Kwon JW, Kim HB, Lee SY, Park KS, Yu J, Kim HC, Leem JH, Lee JY, Sakong J, Kim SY, Lee CG, Kang DM, Ha M, Hong YC, Kwon HJ, Hong SJ. Air pollution interacts with past episodes of bronchiolitis in the development of asthma. *Allergy*. 2013 Jan 25. doi: 10.1111/all.12104. [Epub ahead of print]
54. Gan WQ, Fitzgerald JM, Carlsten C, Sadatsafavi M, Brauer M. Associations of Ambient Air Pollution with Chronic Obstructive

Pulmonary Disease Hospitalization and Mortality. Am J Respir Crit Care Med. 2013 Feb 7. [Epub ahead of print]

55. Wright RJ, Brunst KJ. Programming of respiratory health in childhood: influence of outdoor air pollution. Curr Opin Pediatr. 2013 Feb 15. [Epub ahead of print]
56. Dong GH, Qian ZM, Liu MM, Wang D, Ren WH, Bawa S, Fu J, Wang J, Lewis R, Zelicoff A, Simckes M, Trevathan E. Breastfeeding as a Modifier of the Respiratory Effects of Air Pollution in Children. Epidemiology. 2013 Feb 20. [Epub ahead of print]
57. Farhat SC, Almeida MB, Silva-Filho LV, Farhat J, Rodrigues JC, Braga AL. Ozone is associated with an increased risk of respiratory exacerbations in cystic fibrosis patients. Chest. 2013 Mar 14. doi: 10.1378/chest.12-2414. [Epub ahead of print]
58. Skrzypek M, Zejda JE, Kowalska M, Czech EM.AM, Tager IB, Carmichael SL, Int J Occup Med Environ Health. 2013 Mar 22. [Epub ahead of print] Effect of residential proximity to traffic on respiratory disorders in school children in upper Silesian Industrial Zone, Poland.
59. Rowan-Carroll A, Halappanavar S, Williams A, Somers CM, Yauk CL. Mice exposed in situ to urban air pollution exhibit pulmonary alterations in gene expression in the lipid droplet synthesis pathways. Environ Mol Mutagen. 2013 Mar 27. doi: 10.1002/ em.21768. [Epub ahead of print]
60. Perez L, et al. Chronic burden of near-roadway traffic pollution in 10 European cities (APHEKOM network). European Respiratory Journal, 22 March 2013 DOI: 10.1183/09031936.00031112

61. Vattanasit U, Navasumrit P, Khadka MB, Kanitwithayanun J, Promvijit J, Autrup H, Ruchirawat M. Oxidative DNA damage and inflammatory responses in cultured human cells and in humans exposed to traffic-related particles. *Int J Hyg Environ Health*. 2013 Mar 15. pii: S1438-4639(13)00040-0. doi: 10.1016/j.ijheh.2013.03.002. [Epub ahead of print]
62. LiP, XinJ, WangY, WangS, LiG, PanX, LiuZ, WangL. The acute effects of fine particles on respiratory mortality and morbidity in Beijing, 2004-2009. *Environ Sci Pollut Res Int*. 2013 Apr 16. [Epub ahead of print]
63. Stern G, Latzin P, Röösli M, Fuchs O, Proietti E, Kuehni C, Frey U. A Prospective Study of the Impact of Air Pollution on Respiratory Symptoms and Infections in Infants. *Am J Respir Crit Care Med*. 2013 Apr 17. [Epub ahead of print].
64. Steinvil A, Shmueli H, Ben-Assa E, Leshem-Rubinow E, Shapira I, Berliner S, Kordova-Biezuner L, Rogowski O. Environmental exposure to combustion-derived air pollution is associated with reduced functional capacity in apparently healthy individuals. *Clin Res Cardiol*. 2013 Apr 26. [Epub ahead of print]
65. Hystad P, Demers PA, Johnson KC, Carpiano RM, Brauer M. Long-term Residential Exposure to Air Pollution and Lung Cancer Risk. *Epidemiology*. 2013 May 14. [Epub ahead of print]
66. Möller A, Agius RM, de Vocht F, Lindley S, Gerrard W, Lowe L, Belgrave D, Custovic A, Simpson A. Long Term Exposure to PM10 and NO₂ in Association with Lung Volume and Airway Resistance in the MAAS Birth Cohort. *Environ Health Perspect*. 2013 Jun 18. [Epub ahead of print]

67. Stafoggia M, Samoli E, Alessandrini E, Cadum E, Ostro B, Berti G, Faustini A, Jacquemin B, Linares C, Pascal M, Randi G, Ranzi A, Stivanello E, Forastiere F; Short-term Associations between Fine and Coarse Particulate Matter and Hospitalizations in Southern Europe: Results from the MED-PARTICLES Project. *Environ Health Perspect*. 2013 Jun 18. [Epub ahead of print]
68. Tanaka T, Asai M, Yanagita Y, Nishinakagawa T, Miyamoto N, Kotaki K, Yano Y, Kozu R, Honda S, Senju H. Longitudinal study of respiratory function and symptoms in a non-smoking group of long-term officially-acknowledged victims of pollution-related illness. *BMC Public Health*. 2013 Aug 17;13(1):766. [Epub ahead of print]
69. Jedrychowski WA, Perera FP, Maugeri U, Mroz E, Klimaszewska-Rembiasz M, Flak E, Edwards S, Spengler JD. Effect of prenatal exposure to fine particulate matter on ventilatory lung function of preschool children of non-smoking mothers. *Paediatr Perinat Epidemiol*. 2010 Sep;24(5):492-501. doi: 10.1111/j.1365-3016.2010.01136.x.
70. Acciani TH, Brandt EB, Khurana Hershey GK, Le Cras TD. Diesel Exhaust Particle Exposure Increases Severity of Allergic Asthma in Young Mice. *Clin Exp Allergy*. 2013 Sep 24. doi: 10.1111/cea.12200. [Epub ahead of print]
71. Saravia J, You D, Thevenot P, Lee GI, Shrestha B, Lomnicki S, Cormier SA. Early-life exposure to combustion-derived particulate matter causes pulmonary immunosuppression. *Mucosal Immunol*. 2013 Oct 30. doi: 10.1038/mi.2013.88. [Epub ahead of print]
72. Johannson KA, Vittinghoff E, Lee K, Balmes JR, Ji W, Kaplan GG, Kim DS, Collard HR. Acute exacerbation of idiopathic

pulmonary fibrosis associated with air pollution exposure. Eur Respir J. 2013 Oct 31. [Epub ahead of print]

73. Rice MB, Ljungman PL, Wilker EH, Gold DR, Schwartz JD, Koutrakis P, Washko GR, O'Connor GT, Mittleman MA. Short-Term Exposure to Air Pollution and Lung Function in the Framingham Heart Study. Am J Respir Crit Care Med. 2013 Nov 7. [Epub ahead of print]
74. Vempilly J, Abejje B, Diep V, Gushiken M, Rawat M, Tyner TR. Exp Lung Res. 2013 Nov 18. [Epub ahead of print] The synergistic effect of ambient PM_{2.5} exposure and rhinovirus infection in airway dysfunction in asthma: A pilot observational study from the central valley of California.
75. Villeneuve PJ, Jerrett M, Brenner D, Su J, Chen H, McLaughlin JR. A Case-Control Study of Long-Term Exposure to Ambient Volatile Organic Compounds and Lung Cancer in Toronto, Ontario, Canada. Am J Epidemiol. 2013 Nov 27. [Epub ahead of print]
76. Rice MB, et al. Short-Term Exposure to Air Pollution and Lung Function in the Framingham Heart Study", American Journal of Respiratory and Critical Care Medicine, Vol. 188, No. 11 (2013), pp. 1351-1357. doi: 10.1164/rccm.201308-1414OC
77. Malig B, Green S, Basu R, Broadwin R. Coarse Particles and Respiratory Emergency Department Visits in California. Am. J. Epidemiol. (2013) doi: 10.1093/aje/kws451 First published online: May 31, 2013
78. Jung KH¹, Perzanowski M², Rundle A³, Moors K⁴, Yan B⁵, Chillrud SN⁶, Whyatt R⁷, Camann D⁸, Perera FP⁹, Miller RL¹⁰. Polycyclic aromatic hydrocarbon exposure, obesity and

childhood asthma in an urban cohort. Environ Res. 2014 Jan;128:35-41. doi: 10.1016/j.envres.2013.12.002. Epub 2013 Dec 27.

79. Nadeau K, McDonald-Hyman C, Noth EM, Pratt B, Hammond SK, Balmes J, Tager I. Ambient air pollution impairs regulatory T-cell function in asthma. J Allergy Clin Immunol. 2010 Oct;126(4):845-852.e10. doi: 10.1016/j.jaci.2010.08.008.

80. Yamazaki S, Shima M, Nakadate T, Ohara T, Omori T, Ono M, Sato T, Nitta H. Association between traffic-related air pollution and development of asthma in school children: Cohort study in Japan. J Expo Sci Environ Epidemiol. 2014 Mar 12. doi: 10.1038/jes.2014.15. [Epub ahead of print]

81. Szema A M, et al. Iraq Dust Is Respirable, Sharp, and Metal-Laden and Induces Lung Inflammation With Fibrosis in Mice via IL-2 Upregulation and Depletion of Regulatory T Cells. Journal of Occupational & Environmental Medicine: March 2014 - Volume 56 - Issue 3 - p 243–251 doi: 10.1097/JOM.0000000000000119

82. Deng X, Zhang F, Rui W, Long F, Wang L, Feng Z, Chen D, Ding W. PM2.5- induced oxidative stress triggers autophagy in human lung epithelial A549 cells. Toxicol In Vitro. 2013 Sep;27(6):1762-70. doi: 10.1016/j.tiv.2013.05.004. Epub 2013 May 17.

83. Deng X, Zhang F, Wang L, Rui W, Long F, Zhao Y, Chen D, Ding W. Airborne fine particulate matter induces multiple cell death pathways in human lung epithelial cells. Apoptosis. 2014 Apr 11. [Epub ahead of print]

84. Mu L, Deng F, Tian L, Li Y, Swanson M, Ying J, Browne RW, Rittenhouse-Olson K, Zhang JJ, Zhang ZF, Bonner MR. Peak expiratory flow, breath rate and blood pressure in adults with changes in particulate matter air pollution during the Beijing Olympics: A panel study. *Environ Res.* 2014 Jun 3;133C:4-11. doi: 10.1016/j.envres.2014.05.006. [Epub ahead of print]
85. Delfino RJ, Wu J, Tjoa T, Gullesserian SK, Nickerson B, Gillen DL. Asthma morbidity and ambient air pollution: effect modification by residential traffic-related air pollution. *Epidemiology.* 2014 Jan;25(1):48-57. doi: 10.1097/EDE.0000000000000016.
86. Eeftens M, Hoek G, Gruzieva O. Elemental Composition of Particulate Matter and the Association with Lung Function. *Epidemiology.* 25(5):648-657, September 2014.
87. Gehring U, Gruzieva O, Agius RM, Beelen R, Custovic A, Cyrys J, Eeftens M, Flexeder C, Fuertes E, Heinrich J, Hoffmann B, de Jongste JC, Kerkhof M, Klümper C, Korek M, Möller A, Schultz ES, Simpson A, Sugiri D, Svartengren M, von Berg A, Wijga AH, Pershagen G, Brunekreef B. Air pollution exposure and lung function in children: the ESCAPE project. *Environ Health Perspect.* 2013 Nov-Dec;121(11-12):1357-64. doi: 10.1289/ehp.1306770. Epub 2013 Sep 24.
88. Lepeule J, Litonjua AA, Coull B, Koutrakis P, Sparrow D, Vokonas PS, Schwartz J. Long-term Effects of Traffic Particles on Lung Function Decline in the Elderly. *Am J Respir Crit Care Med.* 2014 Jul 16. [Epub ahead of print]
89. Qiu H, Tian LW, Pun VC, Ho KF, Wong TW, Yu IT. Coarse particulate matter associated with increased risk of emergency hospital admissions for pneumonia in Hong Kong. *Thorax.* 2014

Aug 27. pii: thoraxjnl-2014-205429. doi: 10.1136/thoraxjnl-2014-205429. [Epub ahead of print]

90. Jedrychowski WA, Perera FP, Maugeri U, Majewska R, Mroz E, Flak E, Camann D, Sowa A, Jacek R. Long term effects of prenatal and postnatal airborne PAH exposures on ventilatory lung function of non-asthmatic preadolescent children. Prospective birth cohort study in Krakow. *Sci Total Environ.* 2014 Oct 6;502C:502-509. doi: 10.1016/j.scitotenv.2014.09.051. [Epub ahead of print]
91. Hua J, Yin Y, Peng L, Du L, Geng F, Zhu L. Acute effects of black carbon and PM_{2.5} on children asthma admissions: a time-series study in a Chinese city. *Sci Total Environ.* 2014 May 15;481:433-8. doi: 10.1016/j.scitotenv.2014.02.070. Epub 2014 Mar 12.
92. Bui DS, Burgess JA, Matheson MC, Erbas B, Perret J, Morrison S, Giles GG, Hopper JL, Thomas PS, Markos J, Abramson MJ, Walters EH, Dharmage SC. Ambient wood smoke, traffic pollution and adult asthma prevalence and severity. *Respirology.* 2013 Oct;18(7):1101-7. doi: 10.1111/resp.12108.
93. Baccarelli AA, Zheng Y, Zhang X, Chang D, Liu L, Wolf K, Zhang Z, McCracken JP, Díaz A, Bertazzi P, Schwartz J, Wang S, Kang CM, Koutrakis P, Hou L. Air pollution exposure and lung function in highly exposed subjects in Beijing, China: a repeated-measure study. *Part Fibre Toxicol.* 2014 Oct 2;11(1):51. [Epub ahead of print]
94. Young M, et al. Ambient Air Pollution Exposure and Incident Adult Asthma in a Nationwide Cohort of U.S. Women. *American Journal of Respiratory and Critical Care Medicine*, Vol. 190, No. 8 (2014), pp. 914-921. doi: 10.1164/rccm.201403-0525OC

95. Darrow LA, Klein M, Flanders WD, Mulholland JA, Tolbert PE, Strickland MJ. Air Pollution and Acute Respiratory Infections Among Children 0-4 Years of Age: An 18-Year Time-Series Study. *Am J Epidemiol.* 2014 Oct 16. pii: kwu234. [Epub ahead of print]
96. Luttmann-Gibson H, Sarnat SE, Suh HH, Coull BA, Schwartz J, Zanobetti A, Gold DR. Short-term effects of air pollution on oxygen saturation in a cohort of senior adults in Steubenville, Ohio. *J Occup Environ Med.* 2014 Feb;56(2):149-54. doi: 10.1097/JOM.0000000000000089.
97. Lepeule J, Litonjua AA, Coull B, Koutrakis P, Sparrow D, Vokonas PS, Schwartz J. Long-term effects of traffic particles on lung function decline in the elderly. *Am J Respir Crit Care Med.* 2014 Sep 1;190(5):542-8. doi: 10.1164/rccm.201402-0350OC.
98. Luo B, Shi H, Wang L, Shi Y, Wang C, Yang J, Wan Y, Niu J. Rat Lung Response to PM_{2.5} Exposure under Different Cold Stresses. *Int J Environ Res Public Health.* 2014 Dec 12;11(12):12915-12926.
99. Chen CH, Chan CC, Chen BY, Cheng TJ, Leon Guo Y. Effects of particulate air pollution and ozone on lung function in non-asthmatic children. *Environ Res.* 2014 Dec 5;137C:40-48. doi: 10.1016/j.envres.2014.11.021. [Epub ahead of print]
100. Chen Z, Salam MT, Eckel SP1, Breton CV, Gilliland FD. Chronic effects of air pollution on respiratory health in Southern California children: findings from the Southern California Children's Health Study. *J Thorac Dis.* 2015 Jan;7(1):46-58. doi: 10.3978/j.issn.2072-1439.2014.12.20.

101. Gehring U, Beelen R, Eeftens M, Hoek G, de Hoogh K, de Jongste JC, Keuken M, Koppelman GH, Meliefste K, Oldenwening M, Postma DS, van Rossem L, Wang M, Smit HA, Brunekreef B. Particulate Matter Composition and Respiratory Health: The PIAMA Birth Cohort Study. *Epidemiology*. 2015 Feb 13. [Epub ahead of print]
102. Rice MB, Ljungman PL, Wilker EH, Dorans KS, Gold DR, Schwartz J, Koutrakis P, Washko GR, O'Connor GT, Mittleman MA. Long-Term Exposure to Traffic Emissions and Fine Particulate Matter and Lung Function Decline in the Framingham Heart Study. *Am J Respir Crit Care Med*. 2015 Jan 15. [Epub ahead of print]
103. Yang L, Liu G, Lin Z, Wang Y, He H, Liu T, Kamp DW. Pro-inflammatory response and oxidative stress induced by specific components in ambient particulate matter in human bronchial epithelial cells. *Environ Toxicol*. 2014 Dec 23. doi: 10.1002/tox.22102. [Epub ahead of print]
104. Gauderman WJ, et al. Association of Improved Air Quality with Lung Development in Children. *N Engl J Med* 2015; 372:905-913 March 5, 2015 DOI: 10.1056/ NEJMoa1414123
105. Pope D, et al. Exposure to Household Air Pollution from Wood Combustion and Association with Respiratory Symptoms and Lung Function in Nonsmoking Women: Results from the RESPIRE Trial, Guatemala. *Environ Health Perspect*. 2015 Apr;123(4):285-92. doi: 10.1289/ehp.1408200. Epub 2014 Nov 14
106. Johannson KA, Balmes JR, Collard HR. Air pollution exposure: a novel environmental risk factor for interstitial lung disease? *Chest*. 2015 Apr 1;147(4):1161-7. doi: 10.1378/chest.14-1299.

107. Jacquemin B, et al. Ambient Air Pollution and Adult Asthma Incidence in Six European Cohorts (ESCAPE) Environ Health Perspect; DOI:10.1289/ehp.1408206
108. Upadhyay A, et al. Impact of indoor air pollution from the use of solid fuels on the incidence of life threatening respiratory illnesses in children in India. BMC Public Health. 2015; 15: 300. Published online 2015 Mar 28. doi: 10.1186/s12889-015-1631-7
109. Li MH, Fan LC, Mao B, Yang JW, Choi AM, Cao WJ, Xu JF. Short Term Exposure to Ambient Fine Particulate Matter (PM2.5) Increases Hospitalizations and Mortality of Chronic Obstructive Pulmonary Disease: A Systematic Review and Meta-Analysis. Chest. 2015 Jun 25. doi: 10.1378/chest.15-0513.
110. Künzi L, et al., Toxicity of aged gasoline exhaust particles to normal and diseased airway epithelia. Scientific Reports, 2015; 5: 11801 DOI: 10.1038/srep11801
111. Yang S, et al. Prenatal Particulate Matter/Tobacco Smoke Increases Infants' Respiratory Infections: COCOA Study. Allergy Asthma Immunol Res. 2015 Nov;7(6):573-82. doi: 10.4168/aair.2015.7.6.573. Epub 2015 Jun 25.
112. Zheng XY, et al. Association between Air Pollutants and Asthma Emergency Room Visits and Hospital Admissions in Time Series Studies: A Systematic Review and Meta-Analysis. PLoS One. 2015 Sep 18;10(9):e0138146. doi: 10.1371/journal.pone.0138146.
113. César AC, Carvalho JA Jr, Nascimento LF Association between NO_x exposure and deaths caused by respiratory diseases in a medium-sized Brazilian city. Braz J Med Biol Res.

2015 Sep 29. pii: S0100-879X2015005054396. [Epub ahead of print]

114. Malig BJ, Pearson DL, Chang YB, Broadwin R, Basu R, Green RS, Ostro B. A Time-Stratified Case-Crossover Study of Ambient Ozone Exposure and Emergency Department Visits for Specific Respiratory Diagnoses in California (2005-2008). *Environ Health Perspect.* 2015 Dec 8. [Epub ahead of print]
115. Raanan R, Balmes JR, Harley KG, Gunier RB, Magzamen S, Bradman A, Eskenazi B. Decreased lung function in 7-year-old children with early-life organophosphate exposure. *Thorax.* 2015 Dec 3. pii: thoraxjnl-2014-206622. doi: 10.1136/thoraxjnl-2014-206622. [Epub ahead of print]
116. Ware LB, et al. Long-Term Ozone Exposure Increases the Risk of Developing the Acute Respiratory Distress Syndrome. *Am J Respir Crit Care Med.* 2015 Dec 17. [Epub ahead of print]
117. Schultz E, et al. Early-Life Exposure to Traffic-related Air Pollution and Lung Function in Adolescence. *American Journal of Respiratory and Critical Care Medicine*, Vol. 193, No. 2 (2016), pp. 171-177.
118. Heinzerling AP, et al. Lung function in woodsmoke-exposed Guatemalan children following a chimney stove intervention. *Thorax.* 2016 Mar 10. pii: thoraxjnl-2015-207783. doi: 10.1136/thoraxjnl-2015-207783. [Epub ahead of print]
119. Sbihi H, et al. Perinatal air pollution exposure and development of asthma from birth to age 10. *Euro Respir J* 2016; DOI: 10.1183/13993003.00736-2015.

120. Berhane K, et al. Association of Changes in Air Quality With Bronchitic Symptoms in Children in California, 1993-2012. *JAMA*, 2016; 315 (14): 1491 DOI: 10.1001/jama.2016.3444
121. Amadeo B, et al. Impact of close-proximity air pollution on lung function in schoolchildren in the French West Indies. *BMC Public Health*. 2015; 15: 45. Published online 2015 Jan 31. doi: 10.1186/s12889-015-1382-5
122. Upadhyay AK, et al. Impact of indoor air pollution from the use of solid fuels on the incidence of life threatening respiratory illnesses in children in India. *BMC Public Health*. 2015 Mar 28;15:300. doi: 10.1186/s12889-015-1631-7.
123. Krall JR, et al. Associations between Source-Specific Fine Particulate Matter and Emergency Department Visits for Respiratory Disease in Four U.S. Cities. *Environ Health Perspect*. 2016 Jun 17. [Epub ahead of print]
124. Shi J, Chen R, Yang C, Lin Z, Cai J, Xia Y, Wang C, Li H, Johnson N, Xu X, Zhao Z, Kan H. Association between fine particulate matter chemical constituents and airway inflammation: A panel study among healthy adults in China. *Environ Res*. 2016 Jun 21;150:264-268. doi: 10.1016/j.envres.2016.06.022. [Epub ahead of print]
125. Rissler J, et al. Experimental determination of deposition of diesel exhaust particles in the human respiratory tract. *Journal of Aerosol Science*, 2012; 48: 18 DOI: 10.1016/j.jaerosci.2012.01.005
126. Mirabelli MC, et al. Outdoor PM_{2.5}, Ambient Air Temperature, and Asthma Symptoms in the Past 14 Days among

Adults with Active Asthma. Environ Health Perspect. 2016 Jul 6. [Epub ahead of print]

127. Bharadwaj P, et al. Early Life Exposure to the Great Smog of 1952 and the Development of Asthma. Am J Respir Crit Care Med. First published online 08 Jul 2016 as DOI: 10.1164/rccm.201603-0451OC
128. Strickland M, et al. Pediatric Emergency Visits and Short-Term Changes in PM_{2.5} Concentrations in the U.S. State of Georgia. Environ Health Perspect; DOI:10.1289/ehp.1509856
129. Lakey PS, Berkemeier T, Tong H, Arangio AM, Lucas K, Pöschl U, Shiraiwa M. Chemical exposure-response relationship between air pollutants and reactive oxygen species in the human respiratory tract. Sci Rep. 2016 Sep 8;6:32916. doi: 10.1038/srep32916.
130. Sbihi H, Koehoorn M, Tamburic L, Brauer M. Asthma Trajectories in a Population-based Birth Cohort: Impacts of Air Pollution and Greenness. Am J Respir Crit Care Med. 2016 Sep 8. [Epub ahead of print]
131. Santos UP, et al. Association between Traffic Air Pollution and Reduced Forced Vital Capacity: A Study Using Personal Monitors for Outdoor Workers. PLoS One. 2016 Oct 6;11(10):e0163225.
132. Lanari M, et al. Exposure to vehicular traffic is associated to a higher risk of hospitalization for bronchiolitis during the first year of life. Minerva Pediatr. 2016 Dec;68(6):391-397. Epub 2015 Sep 18.

133. Fisher JE, Loft S, Ulrik CS, Raaschou-Nielsen O, Hertel O, Tjønneland A, Overvad K, Nieuwenhuijsen MJ, Andersen ZJ. Physical Activity, Air Pollution and the Risk of Asthma and Chronic Obstructive Pulmonary Disease. *Am J Respir Crit Care Med.* 2016 Sep 21. [Epub ahead of print]
134. Rush B, et al. Association between chronic exposure to air pollution and mortality in the acute respiratory distress syndrome. *Environ Pollut.* 2017 Feb 12. pii: S0269-7491(16)32622-7. doi: 10.1016/j.envpol.2017.02.014. [Epub ahead of print]
135. Prieto-Parra L, et al. Air pollution, PM_{2.5} composition, source factors, and respiratory symptoms in asthmatic and nonasthmatic children in Santiago, Chile. *Environ Int.* 2017 Feb 12. pii: S0160-4120(17)30192-7. doi: 10.1016/j.envint.2017.01.021. [Epub ahead of print]
136. Li XY, Hao L, Liu YH, Chen CY, Pai VJ, Kang JX. Protection against fine particle-induced pulmonary and systemic inflammation by omega-3 polyunsaturated fatty acids. *Biochim Biophys Acta.* 2017 Mar; 1861(3):577-584. PMID: 28011301.
137. O'Lenick CR, et al. Ozone and childhood respiratory disease in three US cities: evaluation of effect measure modification by neighborhood socioeconomic status using a Bayesian hierarchical approach. *Environ Health.* 2017 Apr 5;16(1):36. doi: 10.1186/s12940-017-0244-2.
138. Mazenq J, et al. Air pollution and children's asthma-related emergency hospital visits in southeastern France. *Eur J Pediatr.* 2017 Apr 5. doi: 10.1007/s00431-017-2900-5. [Epub ahead of print]

139. Chowdhury PH, et al. Synergistic effect of carbon nuclei and polycyclic aromatic hydrocarbons on respiratory and immune responses. *Environ Toxicol*. 2017 Apr 26. doi: 10.1002/tox.22430. [Epub ahead of print]
140. Liu Y, Feng GZ, Du Q, Jin XX, Du XR. Fine particulate matter aggravates allergic airway inflammation through thymic stromal lymphopoietin activation in mice. *Mol Med Rep*. 2017 Jul 26. doi: 10.3892/mmr.2017.7089. [Epub ahead of print]
141. Panis L, Provost EB, Cox B, Louwies T, Laeremans M, Standaert A, Dons E, Holmstock L, Nawrot T, De Boever P. Short-term air pollution exposure decreases lung function: a repeated measures study in healthy adults. *Environ Health*. 2017 Jun 14;16(1):60. doi: 10.1186/s12940-017-0271-z. PMID: 28615020 [PubMed - in process]
142. Sesé L, et al. Role of atmospheric pollution on the natural history of idiopathic pulmonary fibrosis. *Thorax*. 2017 Aug 10. pii: thoraxjnl-2017-209967. doi: 10.1136/thoraxjnl-2017-209967. [Epub ahead of print]
143. Deng Q, et al. Particle deposition in tracheobronchial airways of an infant, child and adult. *Sci Total Environ*. 2017 Aug 27;612:339-346. doi: 10.1016/j.scitotenv.2017.08.240. [Epub ahead of print]
144. Malley C, et al. Updated Global Estimates of Respiratory Mortality in Adults ≥ 30 Years of Age Attributable to Long-Term Ozone Exposure. *Environ Health Perspect*; DOI:10.1289/EHP1390
145. Doiron D, et al. Residential Air Pollution and Associations with Wheeze and Shortness of Breath in Adults: A Combined

Analysis of Cross-Sectional Data from Two Large European Cohorts. Environ Health Perspect; DOI:10.1289/EHP1353

146. de Oliveira Alves N, et al. Biomass burning in the Amazon region causes DNA damage and cell death in human lung cells. *Scientific Reports*, 2017; 7 (1) DOI: 10.1038/s41598-017-11024-3
147. Bowatte G, et al. Traffic-related air pollution exposure over a 5-year period is associated with increased risk of asthma and poor lung function in middle age. *Eur Respir J*. 2017 Oct 26;50(4). pii: 1602357. doi: 10.1183/13993003.02357-2016. Print 2017 Oct.
148. Yoda Y, et al. Acute effects of air pollutants on pulmonary function among students: a panel study in an isolated island. *Environ Health Prev Med*. 2017 Apr 4;22(1):33. doi: 10.1186/s12199-017-0646-3.
149. Girguis MS, et al. Exposure to acute air pollution and risk of bronchiolitis and otitis media for preterm and term infants. *J Expo Sci Environ Epidemiol*. 2017 Dec 21. doi: 10.1038/s41370-017-0006-9. [Epub ahead of print]
150. Pirozzi CS, Jones BE, VanDerslice JA, Zhang Y, Paine R, Dean N. Short-Term Air Pollution and Incident Pneumonia: A Case-Crossover Study. *Ann Am Thorac Soc*. 2017 Dec 28. doi: 10.1513/AnnalsATS.201706-495OC. [Epub ahead of print]
151. Siddharthan T, et al. Association Between Household Air Pollution Exposure and Chronic Obstructive Pulmonary Disease Outcomes in 13 Low- and Middle-income Country Settings. *Am J Respir Crit Care Med*. 2018 Jan 11. doi: 10.1164/rccm.201709-1861OC. [Epub ahead of print]

152. Kim YH, et al. Mutagenicity and Lung Toxicity of Smoldering vs. Flaming Emissions from Various Biomass Fuels: Implications for Health Effects from Wildland Fires. *Environ Health Perspect*; DOI:10.1289/EHP2200
153. Rosa MJ, et al. Evidence establishing a link between prenatal and early-life stress and asthma development. *Curr Opin Allergy Clin Immunol*. 2018 Jan 23. doi: 10.1097/ACI.0000000000000421. [Epub ahead of print]
154. Lin H, Qian ZM, Guo Y, Zheng Y, Ai S, Hang J, Wang X, Zhang L, Liu T, Guan W, Li X, Xiao J, Zeng W, Xian H, Howard SW, Ma W, Wu F. The attributable risk of chronic obstructive pulmonary disease due to ambient fine particulate pollution among older adults. *Environ Int*. 2018 Feb 5;113:143-148. doi: 10.1016/j.envint.2018.01.029. [Epub ahead of print] PMID: 29425898 [PubMed - as supplied by publisher]
155. Lavigne É, Bélair MA, Rodriguez Duque D, Do MT, Stieb DM, Hystad P, van Donkelaar A, Martin RV, Crouse DL, Crighton E, Chen H, Burnett RT, Weichenthal S, Villeneuve PJ, To T, Brook JR, Johnson M, Cakmak S, Yasseen AS 3rd, Walker M. Effect modification of perinatal exposure to air pollution and childhood asthma incidence. *Eur Respir J*. 2018 Feb 1. pii: 1701884. doi: 10.1183/13993003.01884-2017.
156. Dubrowski A, et al. Long-Term Exposure to Ambient Air Pollution in Childhood-Adolescence and Lung Function in Adulthood. *Adv Exp Med Biol*. 2018 Feb 15. doi: 10.1007/5584_2018_162. [Epub ahead of print]
157. Bai L, et al. Exposure to traffic-related air pollution and acute bronchitis in children: season and age as modifiers. *J*

Epidemiol Community Health. 2018 Feb 9. pii: jech-2017-209948. doi: 10.1136/jech-2017-209948. [Epub ahead of print]

158. Khalili R, et al. Early-life exposure to PM_{2.5} and risk of acute asthma clinical encounters among children in Massachusetts: a case-crossover analysis. Environ Health. 2018 Feb 21;17(1):20. doi: 10.1186/s12940-018-0361-6.
159. Mei M, et al. Early-life exposure to three size-fractionated ultrafine and fine atmospheric particulates in Beijing exacerbates asthma development in mature mice. Part Fibre Toxicol. 2018 Mar 14;15(1):13. doi: 10.1186/s12989-018-0249-1.
160. Bai Y, et al. Carbon load in airway macrophages as a biomarker of exposure to particulate air pollution; a longitudinal study of an international Panel. Part Fibre Toxicol. 2018 Mar 14;15(1):14. doi: 10.1186/s12989-018-0250-8.
161. Xu F, et al. Necroptosis Contributes to Urban Particulate Matter-Induced Airway Epithelial Injury. Cell Physiol Biochem. 2018 Mar 29;46(2):699-712. doi: 10.1159/000488726. [Epub ahead of print]
162. Horne BD, et al. Short-term Elevation of Fine Particulate Matter Air Pollution and Acute Lower Respiratory Infection. Am J Respir Crit Care Med. 2018 Apr 13. doi: 10.1164/rccm.201709-1883OC. [Epub ahead of print]
163. Conti S, et al. The association between air pollution and the incidence of idiopathic pulmonary fibrosis in Northern Italy. Eur Respir J. 2018 Jan 25;51(1). pii: 1700397. doi: 10.1183/13993003.00397-2017. Print 2018 Jan.

164. Finke I, et al. Air pollution and airway resistance at age 8 years - the PIAMA birth cohort study. *Environ Health*. 2018 Jul 17;17(1):61. doi: 10.1186/s12940-018-0407-9.
165. Lin MT, et al. Association of meteorological factors and air NO₂ and O₃ concentrations with acute exacerbation of elderly chronic obstructive pulmonary disease. *Sci Rep*. 2018 Jul 5;8(1):10192. doi: 10.1038/s41598-018-28532-5.
166. James KA, et al. Health Services Utilization in Asthma Exacerbations and PM10 Levels in Rural Colorado. *Ann Am Thorac Soc*. 2018 Jul 6. doi: 10.1513/AnnalsATS.201804-273OC. [Epub ahead of print]
167. Lopes dB, et al. Pre- and postnatal exposure of mice to concentrated urban PM2.5 decreases the number of alveoli and leads to altered lung function at an early stage of life. *Environ Pollut*. 2018 Jun 4;241:511-520. doi: 10.1016/j.envpol.2018.05.055. [Epub ahead of print]
168. Choi H, et al. Greater susceptibility of girls to airborne Benzo[a]pyrene for obesity-associated childhood asthma. *Environ Int*. 2018 Sep 17;121(Pt 1):308-316. doi: 10.1016/j.envint.2018.08.061. [Epub ahead of print]
169. Kennedy CM, et al. Associations of mobile source air pollution during the first year of life with childhood pneumonia, bronchiolitis, and otitis media. *Environ Epidemiol*. 2018 Mar;2(1). pii: e007. doi: 10.1097/EE9.0000000000000007.
170. Song J, et al. Acute effects of ambient air pollution on outpatient children with respiratory diseases in Shijiazhuang, China. *BMC Pulm Med*. 2018 Sep 6;18(1):150. doi: 10.1186/s12890-018-0716-3.

171. Milanzi EB, et al. Air pollution exposure and lung function until age 16: the PIAMA birth cohort study. *Eur Respir J*. 2018 Aug 23. pii: 1800218. doi: 10.1183/13993003.00218-2018. [Epub ahead of print]
172. Patel S, et al. Associations between household air pollution and reduced lung function in women and children in rural southern India. *J Appl Toxicol*. 2018 Jul 25. doi: 10.1002/jat.3659. [Epub ahead of print]
173. Beamer PI, et al. CC16 Levels into Adult Life are Associated with Nitrogen Dioxide Exposure at Birth. *Am J Respir Crit Care Med*. 2019 Feb 21. doi: 10.1164/rccm.201808-1488OC. [Epub ahead of print]
174. Usemann J, et al. Exposure to moderate air pollution and associations with lung function at school-age: A birth cohort study. *Environ Int*. 2019 Mar 11;126:682-689. doi: 10.1016/j.envint.2018.12.019. [Epub ahead of print]
175. Liu Y, et al. Short-Term Exposure to Ambient Air Pollution and Asthma Mortality. *Am J Respir Crit Care Med*. 2019 Mar 15. doi: 10.1164/rccm.201810-1823OC. [Epub ahead of print]
176. Brigham EP, et al. Omega-3 and Omega-6 Intake Modifies Asthma Severity and Response to Indoor Air Pollution in Children. *Am J Respir Crit Care Med*. 2019 Mar 29. doi: 10.1164/rccm.201808-1474OC. [Epub ahead of print]
177. Rosa MJ, Perzanowski MS. Dietary Fat Intake, Particulate Matter Exposure and Asthma Severity. *Am J Respir Crit Care Med*. 2019 Mar 29. doi: 10.1164/rccm.201902-0296ED. [Epub ahead of print]

178. Ou J, et al. Fine Particulate Matter and Respiratory Healthcare Encounters among Survivors of Childhood Cancers. International Journal of Environmental Research and Public Health, 2019; 16 (6): 1081 DOI: 10.3390/ijerph16061081
179. Wang J, et al. Associations between ambient air pollution and mortality from all causes, pneumonia, and congenital heart diseases among children aged under 5 years in Beijing, China: A population-based time series study. Environ Res. 2019 Jun 11;176:108531. doi: 10.1016/j.envres.2019.108531. [Epub ahead of print]
180. Lee EY, et al. Ambient Air Pollution, Asthma Drug Response and Telomere Length in African American Youth. J Allergy Clin Immunol. 2019 Jun 24. pii: S0091-6749(19)30820-6. doi: 10.1016/j.jaci.2019.06.009. [Epub ahead of print]
181. Doiron D, et al. Air pollution, lung function and COPD: results from the population-based UK Biobank study. European Respiratory Journal, 2019; 1802140 DOI: 10.1183/13993003.02140-2018
182. Wang M, et al. Association Between Long-term Exposure to Ambient Air Pollution and Change in Quantitatively Assessed Emphysema and Lung Function. JAMA, 2019; 322 (6): 546 DOI: 10.1001/jama.2019.10255
183. Leibel S, et al. Increase in Pediatric Respiratory Visits Associated with Santa Ana Wind-driven Wildfire Smoke and PM_{2.5} Levels in San Diego County. Ann Am Thorac Soc. 2019 Dec 20. doi: 10.1513/AnnalsATS.201902-150OC. [Epub ahead of print]

184. Rutlen C, et al. Crop Burning and the Prevalence of Asthma and COPD Emergency Department Treatments in a Rural Arkansas County. *J Asthma*. 2019 Dec 20;1-10. doi: 10.1080/02770903.2019.1708096. [Epub ahead of print]
185. Collaco JM, et al. Impact of road proximity on infants and children with bronchopulmonary dysplasia. *Pediatr Pulmonol*. 2019 Dec 5. doi: 10.1002/ppul.24594. [Epub ahead of print]
186. To T, et al. Early Life Exposure to Air Pollution and Incidence of Childhood Asthma, Allergic Rhinitis and Eczema. *Eur Respir J*. 2019 Dec 5. pii: 1900913. doi: 10.1183/13993003.00913-2019. [Epub ahead of print]
187. Ye Q, et al. Haze facilitates sensitization to house dust mites in children. *Environ Geochem Health*. 2019 Dec 19. doi: 10.1007/s10653-019-00481-6. [Epub ahead of print]
188. Orona NS, et al. Hazardous effects of urban air particulate matter acute exposure on lung and extrapulmonary organs in mice. *Ecotoxicol Environ Saf*. 2019 Dec 30;190:110120. doi: 10.1016/j.ecoenv.2019.110120. [Epub ahead of print]
189. Havet A, et al. Residential exposure to outdoor air pollution and adult lung function, with focus on small airway obstruction. *Environ Res*. 2020 Jan 21;183:109161. doi: 10.1016/j.envres.2020.109161. [Epub ahead of print]
190. Slama A, et al. The short-term effects of air pollution on respiratory disease hospitalizations in 5 cities in Poland: comparison of time-series and case-crossover analyses. *Environ Sci Pollut Res Int*. 2020 Apr 30. doi: 10.1007/s11356-020-08542-5. [Epub ahead of print].

191. Wang Z, et al. Association of hospital admission for bronchiectasis with air pollution: A province-wide time-series study in southern China. *Int J Hyg Environ Health*. 2020 Nov 3;231:113654. doi: 10.1016/j.ijheh.2020.113654. Online ahead of print. PMID: 33157415
192. Willis M, Hystad P, Denham A, Hill E. Natural gas development, flaring practices and paediatric asthma hospitalizations in Texas. *Int J Epidemiol*. 2020 Sep 3:dyaa115. doi: 10.1093/ije/dyaa115. Online ahead of print. PMID: 32879945
193. Wang J, et al. Asthma and allergic rhinitis among young parents in China in relation to outdoor air pollution, climate and home environment. *Sci Total Environ*. 2020 Aug 18;751:141734. doi: 10.1016/j.scitotenv.2020.141734.
194. Yan W, Wang X, Dong T, Sun M, Zhang M, Fang K, Chen Y, Chen R, Sun Z, Xia Y. The impact of prenatal exposure to PM_{2.5} on childhood asthma and wheezing: a meta-analysis of observational studies. *Environ Sci Pollut Res Int*. 2020 May 21. doi: 10.1007/s11356-020-09014-6. [Epub ahead of print]
195. Jia H, Liu Y, Guo D, He W, Zhao L, Xia S. PM2.5-induced pulmonary inflammation via activating of the NLRP3/caspase-1 signaling pathway. *Environ Toxicol*. 2020 Sep 30. doi: 10.1002/tox.23035. Online ahead of print. PMID: 32996690
196. Adamkiewicz G, Liddie J, Gaffin JM. The Respiratory Risks of Ambient/Outdoor Air Pollution. *Clin Chest Med*. 2020 Dec;41(4):809-824. doi: 10.1016/j.ccm.2020.08.013. PMID: 33153697 Review.

197. Han C, et al. Long-term exposure to fine particulate matter and development of chronic obstructive pulmonary disease in the elderly. *Environ Int.* 2020 Jun 29;143:105895. doi: 10.1016/j.envint.2020.105895. [Epub ahead of print]
198. Aguilera, R., Corrington, T., Gershunov, A. et al. Wildfire smoke impacts respiratory health more than fine particles from other sources: observational evidence from Southern California. *Nat Commun* 12, 1493 (2021).
<https://doi.org/10.1038/s41467-021-21708-0>
199. Shim I, Kim W, Kim H, Lim YM, Shin H, Park KS, Yu SM, Kim YH, Sung HK, Eom IC, Kim P, Yu SD. Comparative Cytotoxicity Study of PM2.5 and TSP Collected from Urban Areas. *Toxics.* 2021 Jul 14;9(7):167. doi: 10.3390/toxics9070167. PMID: 34357910; PMCID: PMC8309706.
200. Jia H, Liu Y, Guo D, He W, Zhao L, Xia S. PM2.5-induced pulmonary inflammation via activating of the NLRP3/caspase-1 signaling pathway. *Environ Toxicol.* 2020 Sep 30. doi: 10.1002/tox.23035.
201. Wang Z, et al. Association of hospital admission for bronchiectasis with air pollution: A province-wide time-series study in southern China. *Int J Hyg Environ Health.* 2020 Nov 3;231:113654. doi: 10.1016/j.ijheh.2020.113654.
202. Adamkiewicz G, Liddie J, Gaffin JM. The Respiratory Risks of Ambient/Outdoor Air Pollution. *Clin Chest Med.* 2020 Dec;41(4):809-824. doi: 10.1016/j.ccm.2020.08.013. PMID: 33153697 Review.
203. Duan RR, Hao K, Yang T. Air pollution and chronic obstructive pulmonary disease. *Chronic Dis Transl Med.* 2020 Jul

11;6(4):260-269. doi: 10.1016/j.cdtm.2020.05.004. eCollection 2020 Dec.

204. Elbarbary M, Oganesyan A, Honda T, Kelly P, Zhang Y, Guo Y, Morgan G, Guo Y, Negin J. Ambient air pollution, lung function and COPD: cross-sectional analysis from the WHO Study of AGEing and adult health wave 1. *BMJ Open Respir Res*. 2020 Dec;7(1):e000684. doi: 10.1136/bmjresp-2020-000684

205. Evangelopoulos D, Chatzidiakou L, Walton H, Katsouyanni K, Kelly FJ, Quint JK, Jones RL, Barratt B. Personal exposure to air pollution and respiratory health of COPD patients in London. *Eur Respir J*. 2021 Feb 4:2003432. doi: 10.1183/13993003.03432-2020

206. Martins A, Scotto M, Deus R, Monteiro A, Gouveia S. Association between respiratory hospital admissions and air quality in Portugal: A count time series approach. *PLoS One*. 2021;16(7):e0253455. Published 2021 Jul 9. doi:10.1371/journal.pone.0253455

207. Garcia E, Rice MB, Gold DR. Air pollution and lung function in children. *J Allergy Clin Immunol*. 2021 Jul;148(1):1-14. doi: 10.1016/j.jaci.2021.05.006. PMID: 34238501; PMCID: PMC8274324.

208. Chang-Chien J, Huang JL, Tsai HJ, Wang SL, Kuo ML, Yao TC. Particulate matter causes telomere shortening and increase in cellular senescence markers in human lung epithelial cells. *Ecotoxicol Environ Saf*. 2021 Oct 1;222:112484. doi: 10.1016/j.ecoenv.2021.112484. Epub 2021 Jul 6. PMID: 34237641.

209. Turner A, Brokamp C, Wolfe C, Reponen T, Ryan P. Association between asthma status and the likelihood of experiencing respiratory symptoms when exposed to ultra fine particulate pollution. *Environ Int.* 2021 Jul 5;156:106740. doi: 10.1016/j.envint.2021.106740. Online ahead of print. PMID: 34237487
210. Kim Y, Park EH, Ng CFS, Chung Y, Hashimoto K, Tashiro K, Hasunuma H, Doi M, Tamura K, Moriuchi H, Nishiwaki Y, Kim H, Yi SM, Kim H, Hashizume M. Respiratory function declines in children with asthma associated with chemical species of fine particulate matter (PM_{2.5}) in Nagasaki, Japan. *Environ Health.* 2021 Oct 21;20(1):110. doi: 10.1186/s12940-021-00796-x
211. Geng Y, Cao Y, Zhao Q, Li Y, Tian S. Potential hazards associated with interactions between diesel exhaust particulate matter and pulmonary surfactant. *Sci Total Environ.* 2021 Oct 16:151031. doi: 10.1016/j.scitotenv.2021.151031
212. Renzi M, et al. A nationwide study of air pollution from particulate matter and daily hospitalizations for respiratory diseases in Italy. *Sci Total Environ.* 2021 Oct 16:151034. doi: 10.1016/j.scitotenv.2021.151034
213. Choi SB, Yun S, Kim SJ, Park YB, Oh K. Effects of exposure to ambient air pollution on pulmonary function impairment in South Korea: Korea National Health and Nutritional Examination Survey. *Epidemiol Health.* 2021 Oct 18:e2021082. doi: 10.4178/epih.e2021082
214. Shahabi R, et al. The effect of nanoparticles on pulmonary fibrosis: a systematic review and Meta-analysis of preclinical studies. *Arch Environ Occup Health.* 2022 Mar 4:1-11. doi: 10.1080/19338244.2021.2001637

215. Cheng H, et al. Ambient Air Pollutants and Traffic Factors Were Associated with Blood and Urine Biomarkers and Asthma Risk. *Environ Sci Technol*. 2022 Mar 3. doi: 10.1021/acs.est.1c06916.
216. Zhai X, Wang J, Sun J, Xin L. PM2.5 induces inflammatory responses via oxidative stress-mediated mitophagy in human bronchial epithelial cells. *Toxicol Res (Camb)*. 2022 Jan 19;11(1):195-205. doi: 10.1093/toxres/tfac001. eCollection 2022 Feb. PMID: 35237424
217. Huang ZH, et al. Short-term effects of air pollution on respiratory diseases among young children in Wuhan city, China. *World J Pediatr*. 2022 Mar 25. doi: 10.1007/s12519-022-00533-5
218. Huang W, Wu J, Lin X. Ozone Exposure and Asthma Attack in Children. *Front Pediatr*. 2022 Apr 5;10:830897. doi: 10.3389/fped.2022.830897. PMID: 35450107; PMCID: PMC9016151.
219. Lee KY, et al. Association of air pollution exposure with exercise-induced oxygen desaturation in COPD. *Respir Res*. 2022 Mar 31;23(1):77. doi: 10.1186/s12931-022-02000-1

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Air Pollution and Cancer

***Air pollution is associated with higher rates of breast, lung, prostate, cervical, brain, nasal, pharyngeal, esophageal, liver, pancreatic and stomach cancer, and adult and childhood leukemia. Pre-natal pollution exposure is associated with increased rates of multiple childhood cancers.**

***World health experts now believe that nearly 30% of lung cancer is due to air pollution**

***Air pollution is associated with decreased survival in patients with all types of cancer, especially breast cancer, including those treated for cancer. Air pollution decreases the efficacy of chemotherapy.**

***The World Health Organization has declared air pollution the most important environmental cause of cancer, more important than second hand cigarette smoke. The WHO placed it in the same category as asbestos and ionizing radiation**

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1. Raaschou-Nielsen O, Andersen Z, Hvidberg M, Jensen SS, Ketzel M, Sørensen M, Loft S, Overvad K, Tjønneland A. Lung Cancer Incidence and Long-Term Exposure to Air Pollution from Traffic. *Environ Health Perspect*. 2011 Jan 12. [Epub ahead of print]

2. Crouse DL, Goldberg MS, Ross NA, Chen H, Labrèche F 2010. Postmenopausal Breast Cancer Is Associated with Exposure to Traffic-Related Air Pollution in Montreal, Canada: A Case–Control Study. *Environ Health Perspect* 118:1578–1583. doi:10.1289/ehp.1002221
3. Pearson RL, Wachtel H, Ebi KL. Distance-weighted traffic density in proximity to a home is a risk factor for leukemia and other childhood cancers. *J Air Waste Manag Assoc* 50(2):175–180.
4. Weng HH, Tsai SS, Chen CC, Chiu HF, Wu TN, Yang CYJ. Childhood leukemia development and correlation with traffic air pollution in Taiwan using nitrogen dioxide as an air pollutant marker. *Toxicol Environ Health A*. 2008;71(7):434–8.
5. Langholz B, et al.; Traffic density and the risk of childhood leukemia in a Los Angeles case-control study. *Ann. Epidemiol.* 2002 Oct; 12(7):482–7.
6. Raaschou-Nielsen O, Andersen ZJ, Hvidberg M, Jensen SS, Ketzel M, Sørensen M, Hansen J, Loft S, Overvad K, Tjønneland A. Air pollution from traffic and cancer incidence: a Danish cohort study. *Environ Health*. 2011 Jul 19;10:67. doi: 10.1186/1476-069X-10-67.
7. Luo J, Margolis K, Wactawski-Wende J, et al. Association of active and passive smoking with risk of breast cancer among postmenopausal women: a prospective cohort study. *BMJ* 2011; 342:d1016
8. Amigou A, Sermage-Faure C, Orsi L, Leverger G, Baruchel A, Bertrand Y, et al. 2011. Road Traffic and Childhood Leukemia:

The ESCALE Study (SFCE). Environ Health Perspect
119:566-572. doi:10.1289/ehp.1002429

9. Weng HH, Tsai SS, Chiu HF, Wu TN, Yang CY. Childhood leukemia and traffic air pollution in Taiwan: petrol station density as an indicator. J Toxicol Environ Health A. 2009;72(2):83-7. doi: 10.1080/15287390802477338.
10. Chiu HF, Tsai SS, Chen PS, Liao YH, Liou SH, Wu TN, Yang CY. Traffic air pollution and risk of death from gastric cancer in taiwan: petrol station density as an indicator of air pollutant exposure. J Toxicol Environ Health A. 2011 Sep 15;74(18): 1215-24.
11. Grant WB. Air pollution in relation to U.S. cancer mortality rates: an ecological study; likely role of carbonaceous aerosols and polycyclic aromatic hydrocarbons. Anticancer Res. 2009 Sep;29(9):3537-45.
12. Turner MC, Krewski D, Pope III CA, Chen Y, Gapstur SM, Thun MJ. Long-Term Ambient Fine Particulate Matter Air Pollution and Lung Cancer in a Large Cohort of Never Smokers. Am J Respir Crit Care Med. 2011 Oct 6. [Epub ahead of print] PubMed PMID: 21980033.
13. Hung LJ, Chan TF, Wu CH, Chiu HF, Yang CY. Traffic Air Pollution and Risk of Death from Ovarian Cancer in Taiwan: Fine Particulate Matter (PM(2.5)) as a Proxy Marker. J Toxicol Environ Health A. 2012 Feb 1;75(3):174-82.
14. Silverman DT, Samanic CM, Lubin JH, et al. The diesel exhaust in miners study: a nested case-control study of lung cancer and diesel exhaust. J Natl Cancer Inst. March 2, 2012. doi:10.1093/jnci/djs034.

15. Attfield MD, Schlieff PL, Lubin JH, et al. The diesel exhaust in miners study: a cohort mortality study with emphasis on lung cancer. *J Natl Cancer Inst.* March 2, 2012.
doi:10.1093/jnci/djs035.
16. Vinceti M, Rothman KJ, Crespi CM, Sterni A, Cherubini A, Guerra L, Maffeis G, Ferretti E, Fabbi S, Teggi S, Consonni D, De Girolamo G, Meggiato A, Palazzi G, Paolucci P, Malagoli C. Leukemia risk in children exposed to benzene and PM(10) from vehicular traffic: a case-control study in an Italian population. *Eur J Epidemiol.* 2012 Aug 15. [Epub ahead of print]
17. Yorifuji T, Kashima S, Tsuda T, Ishikawa-Takata K, Ohta T, Tsuruta KI, Doi H. Long- term exposure to traffic-related air pollution and the risk of death from hemorrhagic stroke and lung cancer in Shizuoka, Japan. *Sci Total Environ.* 2012 Nov 30;443C: 397-402. doi: 10.1016/j.scitotenv.2012.10.088. [Epub ahead of print]
18. Parent ME, Goldberg MS, Crouse DL, Ross NA, Chen H, Valois MF, Liautaud A. Traffic-related air pollution and prostate cancer risk: a case-control study in Montreal, Canada. *Occup Environ Med.* 2013 Mar 26. [Epub ahead of print]
19. Williams ES, Mahler B, Van Metre P. Cancer Risk from Incidental Ingestion Exposures to PAHs Associated with Coal-Tar-Sealed Pavement. *Environmental Science & Technology*, 2013; 47 (2): 1101 DOI: 10.1021/es303371t
20. Prenatal air pollution associated higher rates of retinoblastomas, ALL, and germ cell tumors.
<http://www.aacr.org/home/public--media/aacr-in-the-news.aspx?d=3062>

21. Hu H, Dailey AB, Kan H, Xu X. The effect of atmospheric particulate matter on survival of breast cancer among US females. *Breast Cancer Res Treat*. 2013 Apr 17. [Epub ahead of print]
22. Ghosh JK, Heck JE, Cockburn M, Su J, Jerrett M, Ritz B. Prenatal Exposure to Traffic-related Air Pollution and Risk of Early Childhood Cancers. *Am J Epidemiol*. 2013 Aug 28. [Epub ahead of print]
23. Bulka C, et al. Residence Proximity to Benzene Release Sites Is Associated With Increased Incidence of Non-Hodgkin Lymphoma. *Cancer*. Article first published online: 29 JUL 2013. DOI: 10.1002/cncr.28083
24. Ho CK, Peng CY, Yang CY. Traffic air pollution and risk of death from bladder cancer in Taiwan using petrol station density as a pollutant indicator. *J Toxicol Environ Health A*. 2010;73(1):23-32. doi: 10.1080/15287390903248869.
25. Liu CC, Chen CC, Wu TN, Yang CY. Association of brain cancer with residential exposure to petrochemical air pollution in Taiwan. *J Toxicol Environ Health A*. 2008;71(5):310-4. doi: 10.1080/15287390701738491.
26. Boothe VL, Boehmer TK, Wendel AM, Yip FY. Residential Traffic Exposure and Childhood Leukemia: A Systematic Review and Meta-analysis. *Am J Prev Med*. 2014 Apr;46(4):413-22. doi: 10.1016/j.amepre.2013.11.004. PMID: 24650845 [PubMed - in process]
27. Puett RC, Hart JE, Yanosky JD, Spiegelman D, Wang M, Fisher JA, Hong B, Laden F. Particulate Matter Air Pollution Exposure, Distance to Road, and Incident Lung Cancer in the

Nurses' Health Study Cohort. *Environ Health Perspect*. 2014 Jun 3. [Epub ahead of print]

28. Hamra GB, Guha N, Cohen A, Laden F, Raaschou-Nielsen O, Samet JM, Vineis P, Forastiere F, Saldíva P, Yorifuji T, Loomis D. Outdoor Particulate Matter Exposure and Lung Cancer: A Systematic Review and Meta-Analysis. *Environ Health Perspect*. 2014 Jun 6. [Epub ahead of print]
29. Scheurer ME, Danysh HE, Follen M, Lupo PJ. Association of traffic-related hazardous air pollutants and cervical dysplasia in an urban multiethnic population: a cross-sectional study. *Environ Health*. 2014 Jun 13;13(1):52. [Epub ahead of print]
30. Heck JE, Wu J, Lombardi C, Qiu J, Meyers TJ, Wilhelm M, Cockburn M, Ritz B. Childhood cancer and traffic-related air pollution exposure in pregnancy and early life. *Environ Health Perspect*. 2013 Nov-Dec;121(11-12):1385-91. doi: 10.1289/ehp.1306761. Epub 2013 Sep 9.
31. Cui P, Huang Y, Han J, Song F, Chen K. Ambient particulate matter and lung cancer incidence and mortality: a meta-analysis of prospective studies. *Eur J Public Health*. 2014 Sep 8. pii: cku145. [Epub ahead of print]
32. Scheurer ME, Danysh HE, Follen M, Lupo PJ. Association of traffic-related hazardous air pollutants and cervical dysplasia in an urban multiethnic population: a cross-sectional study. *Environ Health*. 2014 Jun 13;13(1):52. doi: 10.1186/1476-069X-13-52.
33. Luanpitpong S, Chen M, Knuckles T, Wen S, Luo J, Ellis E, Hendryx M, Rojanasakul Y. Appalachian Mountaintop Mining Particulate Matter Induces Neoplastic Transformation of Human

Bronchial Epithelial Cells and Promotes Tumor Formation.
Environ Sci Technol. 2014 Oct 27. [Epub ahead of print]

34. Greenop KR, Hinwood AL, Fritschi L, Scott RJ, Attia J, Ashton LJ, Heath JA, Armstrong BK, Milne E. Vehicle refueling, use of domestic wood heaters and the risk of childhood brain tumours: Results from an Australian case-control study. *Pediatr Blood Cancer*. 2014 Oct 4. doi: 10.1002/pbc.25268. [Epub ahead of print]
35. Arrieta O, et al. Clinical and pathological characteristics, outcome and mutational profiles regarding non-small-cell lung cancer related to wood-smoke exposure. *J Thorac Oncol*. 2012 Aug;7(8):1228-34. doi: 10.1097/JTO.0b013e3182582a93.
36. Hernández-Garduño E, et al. Wood smoke exposure and lung adenocarcinoma in non-smoking Mexican women. *Int J Tuberc Lung Dis*. 2004 Mar;8(3):377-83.
37. Javier Pintos J, et al. Use of wood stoves and risk of cancers of the upper aero- digestive tract: a case-control study. *Int. J. Epidemiol*. (1998) 27 (6): 936-940 doi: 10.1093/ije/27.6.936
38. Ding N, Zhou N, Zhou M, Ren GM. Respiratory cancers and pollution. *Eur Rev Med Pharmacol Sci*. 2015 Jan;19(1):31-7.
39. Yang WS, Zhao H, Wang X, Deng Q, Fan WY, Wang L. An evidence-based assessment for the association between long-term exposure to outdoor air pollution and the risk of lung cancer. *Eur J Cancer Prev*. 2015 Mar 9. [Epub ahead of print]
40. Chen G, Wan X, Yang G, Zou X. Traffic-related air pollution and lung cancer: A meta-analysis. *Thorac Cancer*. 2015

May;6(3):307-18. doi: 10.1111/1759-7714.12185. Epub 2015 Apr 24.

41. Hart J, et al. Long-Term Ambient Residential Traffic-Related Exposures and Measurement Error-Adjusted Risk of Incident Lung Cancer in the Netherlands Cohort Study on Diet and Cancer. *Environ Health Perspect*; DOI:10.1289/ehp.1408762
42. Raaschou-Nielsen O, et al. Traffic-related air pollution and risk for leukaemia of an adult population. *Int J Cancer*. 2015 Sep 28. doi: 10.1002/ijc.29867. [Epub ahead of print]
43. Hoot, J. et al. Residential Proximity to Heavy-Traffic Roads, Benzene Exposure, and Childhood Leukemia—The GEOCAP Study, 2002–2007. *American Journal of Epidemiology* Volume 182, Issue 8Pp. 685-693
44. von Ehrenstein O, et al. In Utero and Early-Life Exposure to Ambient Air Toxics and Childhood Brain Tumors: A Population-Based Case-Control Study in California, USA. *Environ Health Perspect*; DOI:10.1289/ehp.1408582
45. Pan W, et al. Fine Particle Pollution, Alanine Transaminase, and Liver Cancer: A Taiwanese Prospective Cohort Study (REVEAL-HBV). *J Natl Cancer Inst*. 2015 Nov 11;108(3). pii: djv341. doi: 10.1093/jnci/djv341. Print 2015 Mar.
46. Guo Y, et al. The association between lung cancer incidence and ambient air pollution in China: A spatiotemporal analysis. *Environ Res*. 2015 Nov 9;144(Pt A):60-65. doi: 10.1016/j.envres.2015.11.004. [Epub ahead of print]

47. Spycher BD, et al. Childhood cancer and residential exposure to highways: a nationwide cohort study. *Eur J Epidemiol.* 2015 Nov 2. [Epub ahead of print]
48. Raaschou-Nielsen O, et al. *Environ Int.* 2015 Nov 28;87:66-73. doi: 10.1016/j.envint.2015.11.007. [Epub ahead of print]. Particulate matter air pollution components and risk for lung cancer.
49. White AJ, et al. Sources of polycyclic aromatic hydrocarbons are associated with gene-specific promoter methylation in women with breast cancer. *Environ Res.* 2015 Dec 6;145:93-100. doi: 10.1016/j.envres.2015.11.033. [Epub ahead of print]
50. Raaschou-Nielsen O, Andersen Z, Beelen R, et al. Air pollution and lung cancer incidence in 17 European cohorts: prospective analyses from the European Study of Cohorts for Air Pollution Effects (ESCAPE). *The Lancet.* Published online July 10 2013
51. Poulsen AH, et al. Air pollution from traffic and risk for brain tumors: a nationwide study in Denmark. *Cancer Causes Control.* 2016 Feb 18. [Epub ahead of print]
52. Wong CM, et al. Cancer Mortality Risks from Long-term Exposure to Ambient Fine Particle. *Cancer Epidemiol Biomarkers Prev;* Published OnlineFirst April 29, 2016; doi 10.1158/1055-9965.EPI-15-0626
53. Janitz AE, et al. Traffic-related air pollution and childhood acute leukemia in Oklahoma. *Environmental Research.* Volume 148, July 2016, Pages 102–111

54. Tomczak A, et al. Long-term exposure to fine particulate matter air pollution and the risk of lung cancer among participants of the Canadian National Breast Screening Study. *Int J Cancer*. 2016 Jul 6. doi: 10.1002/ijc.30255. [Epub ahead of print]
55. von Ehrenstein O, et al. In Utero and Early-Life Exposure to Ambient Air Toxics and Childhood Brain Tumors: A Population-Based Case–Control Study in California, USA *Environ Health Perspect*; DOI:10.1289/ehp.1408582
56. Visani G, et al. Environmental nanoparticles are significantly over-expressed in acute myeloid leukemia. *Leuk Res*. 2016 Nov;50:50-56.
57. Elliott EG, Trinh P, Ma X, Leaderer BP, Ward MH, Deziel NC. Unconventional oil and gas development and risk of childhood leukemia: Assessing the evidence. *Sci Total Environ*. 2016 Oct 23;576:138-147. doi: 10.1016/j.scitotenv.2016.10.072. [Epub ahead of print]
58. Cohen G, et al. Long-term exposure to traffic-related air pollution and cancer among survivors of myocardial infarction: A 20-year follow-up study. *Eur J Prev Cardiol*. 2016 Sep 13. pii: 2047487316669415. [Epub ahead of print]
59. Pedersen M, et al. Ambient air pollution and primary liver cancer incidence in four European cohorts within the ESCAPE project. *Environ Res*. 2017 Jan 17;154:226-233. doi: 10.1016/j.envres.2017.01.006. [Epub ahead of print]
60. Gharibvand L, et al. The Association between Ambient Fine Particulate Air Pollution and Lung Cancer Incidence: Results from

the AHSMOG-2 Study. Environ Health Perspect; DOI:10.1289/EHP124

61. Sifaki-Pistolla D, Lionis C, Koinis F, Georgoulias V, Tzanakis N; On behalf of the Cancer Registry of Crete (CRC). Lung cancer and annual mean exposure to outdoor air pollution in Crete, Greece. Eur J Cancer Prev. 2017 Jul 25. doi: 10.1097/CEJ.0000000000000407. [Epub ahead of print]
62. White AJ, et al. Indoor Wood-Burning Stove and Fireplace Use and Breast Cancer in a Prospective Cohort Study. Environ Health Perspect. 2017 Jul 18;125(7):077011. doi: 10.1289/EHP827.
63. Large C, Wei Y. Geographic variations in female breast cancer incidence in relation to ambient air emissions of polycyclic aromatic hydrocarbons. Environ Sci Pollut Res Int. 2017 Jun 14. doi: 10.1007/s11356-017-9395-5. [Epub ahead of print]
64. Goldberg MS, et al. The association between the incidence of postmenopausal breast cancer and concentrations at street-level of nitrogen dioxide and ultrafine particles. Environ Res. 2017 Jun 5;158:7-15. doi: 10.1016/j.envres.2017.05.038. [Epub ahead of print]
65. Deng H, et al. Particulate matter air pollution and liver cancer survival. Int J Cancer. 2017 Jun 7. doi: 10.1002/ijc.30779. [Epub ahead of print]
66. García-Pérez J, López-Cima MF, Pérez-Gómez B, Aragonés N, Pollán M, Vidal E, et al. Mortality due to tumours of the

digestive system in towns lying in the vicinity of metal production and processing installations. *Sci Total Environ* 2010;408:3102–12.

67. Sapkota A, Zaridze D, Szeszenia-Dabrowska N, Mates D, Fabiánová E, Rudnai P .. Indoor air pollution from solid fuels and risk of upper aerodigestive tract cancers in central and eastern Europe. *Environ Res* 2013;120:90–5
68. Collarile P, et al. Residence in Proximity of a Coal-Oil-Fired Thermal Power Plant and Risk of Lung and Bladder Cancer in North-Eastern Italy. A Population-Based Study: 1995-2009. *Int J Environ Res Public Health*. 2017 Jul 31;14(8). pii: E860. doi: 10.3390/ijerph14080860.
69. Andersen Z, et al. Long-term Exposure to Ambient Air Pollution and Incidence of Brain Tumor: the European Study of Cohorts for Air Pollution Effects (ESCAPE). *Neuro Oncol*. 2017 Aug 31. doi: 10.1093/neuonc/nox163. [Epub ahead of print]
70. Lamichhane DK, et al. Lung Cancer Risk and Residential Exposure to Air Pollution: A Korean Population-Based Case-Control Study. *Yonsei Med J*. 2017 Nov;58(6):1111-1118. doi: 10.3349/ymj.2017.58.6.1111.
71. Turner MC, et al. Ambient Air Pollution and Cancer Mortality in the Cancer Prevention Study II. *Environ Health Perspect*. 2017 Aug 21;125(8):087013.
72. Liao Y, et al. Temporal Trend in Lung Cancer Burden Attributed to Ambient Fine Particulate Matter in Guangzhou, China. *Biomed Environ Sci*. 2017 Oct;30(10):708-717. doi: 10.3967/bes2017.096.

73. Delgado J, et al. Lung Cancer Pathogenesis Associated With Wood Smoke Exposure
July 2005. Volume 128, Issue 1, Pages 124–131
74. Nagel G, et al. Air pollution and incidence of cancers of the stomach and the upper aerodigestive tract in the European Study of Cohorts for Air Pollution Effects (ESCAPE). *Int J Cancer.* 2018 Apr 26. doi: 10.1002/ijc.31564. [Epub ahead of print]
75. Ljubimova, JY, et al. Coarse particulate matter (PM_{2.5–10}) in Los Angeles Basin air induces expression of inflammation and cancer biomarkers in rat brains. *Scientific Reports,* 2018; 8 (1) DOI: 10.1038/s41598-018-23885-3
76. Consonni D, et al. Outdoor particulate matter (PM₁₀) exposure and lung cancer risk in the EAGLE study. *PLoS One.* 2018 Sep 14;13(9):e0203539. doi: 10.1371/journal.pone.0203539. eCollection 2018.
77. Weinmayr G, et al. Particulate matter air pollution components and incidence of cancers of the stomach and the upper aerodigestive tract in the European Study of Cohorts of Air Pollution Effects (ESCAPE). *Environ Int.* 2018 Aug 7;120:163–171. doi: 10.1016/j.envint.2018.07.030. [Epub ahead of print]
78. Ribeiro AG, et al. Incidence and mortality risk for respiratory tract cancer in the city of São Paulo, Brazil: Bayesian analysis of the association with traffic density. *Cancer Epidemiol.* 2018 Jul 23;56:53–59. doi: 10.1016/j.canep.2018.07.005. [Epub ahead of print]

79. Seifi M, et al. Exposure to ambient air pollution and risk of childhood cancers: A population-based study in Tehran, Iran. *Sci Total Environ.* 2018 Jul 24;646:105-110. doi: 10.1016/j.scitotenv.2018.07.219. [Epub ahead of print]
80. Cheng I, et al. Association between ambient air pollution and breast cancer risk: The Multiethnic Cohort Study. *Int J Cancer.* 2019 Mar 28. doi: 10.1002/ijc.32308. [Epub ahead of print]
81. Gong ZH, et al. A Meta-analysis of Traffic-related Air Pollution and Risk of Childhood Leukemia. *J Pediatr Hematol Oncol.* 2019 May;41(4):267-274. doi: 10.1097/MPH.0000000000001413.
82. Ribeiro AG, et al. Bayesian modeling of hematologic cancer and vehicular air pollution among young people in the city of São Paulo, Brazil. *Int J Environ Health Res.* 2019 Apr 26:1-11. doi: 10.1080/09603123.2019.1608916. [Epub ahead of print]
83. Sahay D, et al. Is breast cancer a result of epigenetic responses to traffic-related air pollution? A review of the latest evidence. *Epigenomics.* 2019 May 9. doi: 10.2217/epi-2018-0158. [Epub ahead of print]
84. Hughes BD, et al. Correlation between air quality and lung cancer incidence: A county by county analysis. *Surgery.* 2019 Jul 8. pii: S0039-6060(19)30309-5. doi: 10.1016/j.surg.2019.05.036. [Epub ahead of print].

85. Cohen G, et al. Cancer and mortality in relation to traffic-related air pollution among coronary patients: Using an ensemble of exposure estimates to identify high-risk individuals. *Environ Res.* 2019 Jun 28;176:108560. doi: 10.1016/j.envres.2019.108560. [Epub ahead of print]
86. Niehoff NM, et al. Airborne mammary carcinogens and breast cancer risk in the Sister Study. *Environ Int.* 2019 Jun 18;130:104897. doi: 10.1016/j.envint.2019.06.007. [Epub ahead of print]
87. White AJ, et al. Air Pollution, Clustering of Particulate Matter Components, and Breast Cancer in the Sister Study: A U.S.-Wide Cohort. *Environ Health Perspect.* 2019 Oct;127(10):107002. doi: 10.1289/EHP5131. Epub 2019 Oct 9.
88. Huang HC, et al. Association between coarse particulate matter (PM₁₀-2.5) and nasopharyngeal carcinoma among Taiwanese men. *J Investig Med.* 2019 Oct 16. pii: jim-2019-001119. doi: 10.1136/jim-2019-001119. [Epub ahead of print]
89. Goldberg MS, et al. Associations between incident breast cancer and ambient concentrations of nitrogen dioxide from a national land use regression model in the Canadian National Breast Screening Study. *Environ Int.* 2019 Oct 21;133(Pt B):105182. doi: 10.1016/j.envint.2019.105182. [Epub ahead of print]
90. Zhang Z, et al. Association between particulate matter air pollution and lung cancer. *Thorax.* 2019 Nov 14. pii:

thoraxjnl-2019-213722. doi: 10.1136/thoraxjnl-2019-213722.
[Epub ahead of print]

91. Santibáñez-Andrade M, et al. Deciphering the Code between Air Pollution and Disease: The Effect of Particulate Matter on Cancer Hallmarks. *Int J Mol Sci.* 2019 Dec 24;21(1). pii: E136. doi: 10.3390/ijms21010136.
92. Yin J, et al. Impact of environmental factors on gastric cancer: A review of the scientific evidence, human prevention and adaptation. *J Environ Sci (China).* 2020 Mar;89:65-79. doi: 10.1016/j.jes.2019.09.025. Epub 2019 Nov 4.
93. Liang D, et al. Lung Cancer in Never-Smokers: A Multicenter Case-Control Study in North China. *Front Oncol.* 2019 Dec 10;9:1354. doi: 10.3389/fonc.2019.01354. eCollection 2019.
94. Liu T, et al. Solid fuel use for heating and risks of breast and cervical cancer mortality in China. *Environ Res.* 2020 Apr 28;186:109578. doi: 10.1016/j.envres.2020.109578. [Epub ahead of print]
95. Taj T, et al. Exposure to PM2.5 constituents and risk of adult leukemia in Denmark: A population-based case-control study. *Environ Res.* 2020 Nov 3:110418. doi: 10.1016/j.envres.2020.110418. Online ahead of print. PMID: 33157111
96. Ou JY, Kirchhoff AC, Hanson HA. Air Pollution across the Cancer Continuum: Extending Our Understanding of the Relationship between Environmental Exposures and Cancer.

Cancer Epidemiol Biomarkers Prev. 2020 Oct;29(10):1876-1879.
doi: 10.1158/1055-9965.EPI-19-1588.
PMID: 33004409

97. Ou JY, Kirchhoff AC, Hanson HA. Air Pollution across the Cancer Continuum: Extending Our Understanding of the Relationship between Environmental Exposures and Cancer. Cancer Epidemiol Biomarkers Prev. 2020 Oct;29(10):1876-1879.
doi: 10.1158/1055-9965.EPI-19-1588.
PMID: 33004409

98. Taj T, Poulsen AH, Ketzel M, Geels C, Brandt J, Christensen JH, Puett R, Hvidtfeldt UA, Sørensen M, Raaschou-Nielsen O. Exposure to PM_{2.5} constituents and risk of adult leukemia in Denmark: A population-based case-control study. Environ Res. 2020 Nov 3:110418. doi: 10.1016/j.envres.2020.110418.

99. Zha Z, et al. The effects of air pollution on the lung cancer mortality in rural areas of eastern China: a multi-region study. Environ Sci Pollut Res Int. 2022 Feb 11. doi: 10.1007/s11356-022-19027-y

100. Chen J, et al. Long-term exposure to ambient air pollution and bladder cancer incidence in a pooled European cohort: the ELAPSE project. Br J Cancer. 2022 Feb 16. doi: 10.1038/s41416-022-01735-4

101. Lagunas-Rangel FA, Liu W, Schiöth HB. Can Exposure to Environmental Pollutants Be Associated with Less Effective Chemotherapy in Cancer Patients? Int J Environ Res Public Health. 2022 Feb 12;19(4):2064. doi: 10.3390/ijerph19042064.
PMID: 35206262 Review

102. Rao Z, Xie X, Tang X, Peng H, Zheng Z, Hu Z, Peng X. The spatiotemporal correlation of PM2.5 concentration on esophageal cancer hospitalization rate in Fujian province of China. Environ Sci Pollut Res Int. 2022 May 6. doi: 10.1007/s11356-022-20587-2. Epub ahead of print. PMID: 35524092.

103. Huang YJ, Lee PH, Chen LC, Lin BC, Lin C, Chan TC. Relationships among green space, ambient fine particulate matter, and cancer incidence in Taiwan: A 16-year retrospective cohort study. Environ Res. 2022 May 3:113416. doi: 10.1016/j.envres.2022.113416. Epub ahead of print. PMID: 35523280.

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Air Pollution and Metabolic and Kidney Disorders

* **More exposure to air pollution, even short term, decreases insulin sensitivity, glucose tolerance, increases rates of Type I and Type II diabetes, and promotes obesity and metabolic syndrome.**

***Prenatal exposure has a particularly strong association with childhood obesity.**

***Lipid metabolism is impaired, good cholesterol (HDL) is decreased, and bad cholesterol (LDL) is increased with more air pollution.**

***Air pollution impairs thyroid function in pregnant mothers, thyroid development in the fetus. and thyroid function newborns. Impaired thyroid function is a likely mechanism for air pollution causing low birth weight and can impair fetal brain development**

***Diesel exhaust impairs liver function**

***Early evidence shows air pollution impairs kidney function**

1. Pearson J, Bachireddy C, Shyamprasad S, Goldfine A, Brownstein J. Association Between Fine Particulate Matter and Diabetes Prevalence in the U.S. *Diabetes Care* October 2010 33:2196-2201; published ahead of print July 13, 2010, doi:10.2337/dc10-0698
2. Krämer U, Herder C, Sugiri D, Strassburger K, Schikowski T, Ranft U, et al. 2010. Traffic-related Air Pollution and Incident Type 2 Diabetes: Results from the SALIA Cohort Study. *Environ Health Perspect* :- doi:10.1289/ehp.0901689
3. Puett RC, Hart JE, Schwartz J, Hu FB, Liese AD, Laden F 2011. Are Particulate Matter Exposures Associated with Risk of Type 2 Diabetes? *Environ Health Perspect* 119:384-389. doi:10.1289/ehp.1002344
4. Zou M. Is NAD(P)H Oxidase a Missing Link for Air Pollution-Enhanced Obesity? *Arterioscler Thromb Vasc Biol.* 2010;30:2323-2324, doi:10.1161/ATVBAHA.110.216648

5. Toperoff G, Aran D, Kark J, Rosenberg M, et al. Genome-wide survey reveals predisposing diabetes type 2-related DNA methylation variations in human peripheral blood. *Hum. Mol. Genet.* (2012) 21(2): 371-383 doi:10.1093/hmg/ddr472
6. Makaji E, Raha S, Wade MG, Holloway AC. Effect of environmental contaminants on Beta cell function. *Int J Toxicol.* 2011 Aug;30(4):410-8. Epub 2011 Jun 24.
7. Coogan PF, White LF, Jerrett M, Brook RD, Su JG, Seto E, Burnett R, Palmer JR, Rosenberg L. Air Pollution and Incidence of Hypertension and Diabetes in African American Women Living in Los Angeles. *Circulation.* 2012 Jan 4. [Epub ahead of print]
8. Xu X, Liu C, Xu Z, Tzan K, et al. Long-term Exposure to Ambient Fine Particulate Pollution Induces Insulin Resistance and Mitochondrial Alteration in Adipose Tissue. *Toxicological Sciences* Volume 124, Issue 1Pp. 88-98
9. Rundle A, Hoepner L, Hassoun A, et al. Association of Childhood Obesity With Maternal Exposure to Ambient Air Polycyclic Aromatic Hydrocarbons During Pregnancy. *Am. J. Epidemiol.* online April 13, 2012 doi:10.1093/aje/kwr45
10. Bolton J, Smith S, Huff N, Gilmour MI, Foster WM, Auten R, and Bilbo S. Prenatal air pollution exposure induces neuroinflammation and predisposes offspring to weight gain in adulthood in a sex-specific manner *FASEB J* fj.12-210989; published ahead of print July 19, 2012, doi:10.1096/fj.12-210989
11. Raaschou-Nielsen O, Sørensen M, Ketzel M, Hertel O, Loft S, Tjønneland A, Overvad K, Andersen ZJ. Long-term exposure to traffic-related air pollution and diabetes-associated mortality: a cohort study. *Diabetologia.* 2012 Aug 24. [Epub ahead of print]

12. Liu C, Ying Z, Harkema J, Sun Q, Rajagopalan S. Epidemiological and Experimental Links between Air Pollution and Type 2 Diabetes. *Toxicol Pathol*. 2012 Oct 26. [Epub ahead of print]
13. Khafaie MA, Salvi SS, Ojha A, Khafaie B, Gore SS, Yajnik CS. Systemic Inflammation (C-Reactive Protein) in Type 2 Diabetic Patients Is Associated With Ambient Air Pollution in Pune City, India. *Diabetes Care*. 2012 Nov 19. [Epub ahead of print]
14. He K, Xun P, Liu K, Morris S, Reis J, Guallar E. Mercury Exposure in Young Adulthood and Incidence of Diabetes Later in Life: The CARDIA trace element study. Published online before print February 19, 2013, doi: 10.2337/dc12-1842 *Diabetes Care* February 19, 2013
15. Chen H, Burnett RT, Kwong JC, Villeneuve PJ, Goldberg MS, Brook RD, van Donkelaar A, Jerrett M, Martin RV, Brook JR, Copes R. Risk of Incident Diabetes in Relation to Long-term Exposure to Fine Particulate Matter in Ontario, Canada. *Environ Health Perspect* (): doi:10.1289/ehp.1205958
16. Thiering E, Cyrys J, Kratzsch J, Meisinger C, Hoffmann B, Berdel D, von Berg A, Koletzko S, Bauer CP, Heinrich J. Long-term exposure to traffic-related air pollution and insulin resistance in children: results from the GINIplus and LISAplus birth cohorts *Diabetologia*, DOI 10.1007/s00125-013-2925-x
17. Brook RD, Cakmak S, Turner MC, Brook JR, Crouse DL, Peters PA, van Donkelaar A, Villeneuve PJ, Brion O, Jerrett M, Martin RV, Rajagopalan S, Goldberg MS, Pope CA 3rd, Burnett RT. Long-Term Fine Particulate Matter Exposure and Mortality From Diabetes Mellitus in Canada. *Diabetes Care*. 2013 Jun 18. [Epub ahead of print]

18. Liu C, et al. Air Pollution–. Susceptibility to Inflammation and Insulin Resistance: Influence of CCR2 Pathways in Mice. *Environ Health Perspect*; DOI:10.1289/ehp. 1306841
19. Tamayo T, Rathmann W, Krämer U, Sugiri D, Grabert M, Holl RW. Is particle pollution in outdoor air associated with metabolic control in type 2 diabetes? *PLoS One*. 2014 Mar 11;9(3):e91639. doi: 10.1371/journal.pone.0091639. eCollection 2014.
20. Fleisch AF, DR Gold, SL Rifas-Shiman, P Koutrakis, JD Schwartz, I Kloog, S Melly, BA Coull, A Zanobetti, MW Gillman, E Oken. 2014. Air pollution exposure and abnormal glucose tolerance during pregnancy: the Project Viva cohort. *Environmental Health Perspectives*.
<http://dx.doi.org/10.1289/ehp.1307065>.
21. Nemmar A, Al-Salam S, Beegam S, Yuvaraju P, Yasin J, Ali BH. *Cell Physiol Biochem*. 2014 Feb 11;33(2):413-422. [Epub ahead of print] Pancreatic Effects of Diesel Exhaust Particles in Mice with Type 1 Diabetes Mellitus
22. Jerrett M, McConnell R, Wolch J, Chang R, Lam C, Dunton G, Gilliland F, Lurmann F, Islam T, Berhane K. Traffic-related air pollution and obesity formation in children: a longitudinal, multilevel analysis. *Environ Health*. 2014 Jun 9;13(1):49. [Epub ahead of print]
23. Park SK, Wang W. Ambient Air Pollution and Type 2 Diabetes: A Systematic Review of Epidemiologic Research. *Curr Environ Health Rep*. 2014 Sep 1;1(3): 275-286.
24. Wang Y, Eliot MN, Kuchel GA, Schwartz J, Coull BA, Mittleman MA, Lipsitz LA, Wellenius GA. Long-Term Exposure to Ambient Air Pollution and Serum Leptin in Older Adults: Results

From the MOBILIZE Boston Study. J Occup Environ Med. 2014 Sep;56(9):e73-e77.

25. Teichert T, Vossoughi M, Vierkötter A, Sugiri D, Schikowski T, Schulte T, Roden M, Luckhaus C, Herder C, Krämer U. Association between traffic-related air pollution, subclinical inflammation and impaired glucose metabolism: results from the SALIA study. PLoS One. 2013 Dec 10;8(12):e83042. doi: 10.1371/journal.pone.0083042. eCollection 2013.
26. Li C, Fang D, Xu D, Wang B, Zhao S, Yan S, Wang Y. MECHANISMS IN ENDOCRINOLOGY: Main air pollutants and diabetes-associated mortality: a systematic review and meta-analysis. Eur J Endocrinol. 2014 Nov;171(5):R183-R190.
27. Wang B, Xu D, Jing Z, Liu D, Yan S, Wang Y. MECHANISMS IN ENDOCRINOLOGY: Effect of long-term exposure to air pollution on type 2 diabetes mellitus risk: a systemic review and meta-analysis of cohort studies. Eur J Endocrinol. 2014 Nov;171(5):R173-R182.
28. Vella RE, Pillon NJ, Zarrouki B, Croze ML, Koppe L, Guichardant M, Pesenti S, Chauvin MA, Rieusset J, Géloën A, Soulage CO. Ozone exposure triggers insulin resistance through muscle c-Jun N-terminal Kinases (JNKs) activation. Diabetes. 2014 Oct 2. pii: DB_131181. [Epub ahead of print]
29. Park SK, Adar SD, O'Neill MS, Auchincloss AH, Szpiro A, Bertoni AG, Navas-Acien A, Kaufman JD, Diez-Roux AV. Long-Term Exposure to Air Pollution and Type 2 Diabetes Mellitus in a Multiethnic Cohort. Am J Epidemiol. 2015 Feb 17. pii: kwu280. [Epub ahead of print]

30. Meo SA, et al. Effect of environmental air pollution on type 2 diabetes mellitus. *Eur Rev Med Pharmacol Sci.* 2015 Jan;19(1):123-8.
31. Bodin J, Stene LC, Nygaard UC. Can Exposure to Environmental Chemicals Increase the Risk of Diabetes Type 1 Development? *Biomed Res Int.* 2015;2015:208947. Epub 2015 Mar 26.
32. Malmqvist E. Maternal exposure to air pollution and type 1 diabetes - Accounting for genetic factors. *Environ Res.* 2015 Apr 13;140:268-274. doi: 10.1016/j.envres.2015.03.024. [Epub ahead of print]
33. Esposito K, Petrizzo M, Maiorino MI, Bellastella G, Giugliano D. Particulate matter pollutants and risk of type 2 diabetes: a time for concern? *Endocrine.* 2015 May 30. [Epub ahead of print]
34. Thiering E, Heinrich J. Epidemiology of air pollution and diabetes. *Trends Endocrinol Metab.* 2015 Jun 8. pii: S1043-2760(15)00084-3. doi: 10.1016/j.tem.2015.05.002. [Epub ahead of print]
35. Chen Z, et al. Ambient Air Pollutants Have Adverse Effects on Insulin and Glucose Homeostasis in Mexican Americans. *Diabetes Care.* 2016 Feb 11. pii: dc151795. [Epub ahead of print]
36. Thiering E, et al. Associations of Residential Long-Term Air Pollution Exposures and Satellite-Derived Greenness with Insulin Resistance in German Adolescents. *Environ Health Perspect.* 2016 Feb 5. [Epub ahead of print]
37. Wei Y, et al. Chronic exposure to air pollution particles increases the risk of obesity and metabolic syndrome: findings

from a natural experiment in Beijing. *FASEB J.* 2016 Feb 18. pii: fj.201500142. [Epub ahead of print]

38. Hansen AB, et al. Long-term exposure to fine particulate matter and incidence of diabetes in the Danish Nurse Cohort. *Environ Int.* 2016 Mar 15;91:243-250. doi: 10.1016/j.envint.2016.02.036. [Epub ahead of print]

39. Haberzettl P, O'Toole TE, Bhatnagar A, Conklin DJ. Exposure to Fine Particulate Air Pollution Causes Vascular Insulin Resistance by Inducing Pulmonary Oxidative Stress. *Environ Health Perspect.* 2016 Apr 29. [Epub ahead of print]

40. Lavigne E, et al. Air Pollution Exposure During Pregnancy and Fetal Markers of Metabolic Function: The MIREC Study. *Am J Epidemiol.* 2016 Mar 29. pii: kwv256. [Epub ahead of print]

41. Liu C, et al. Associations between long-term exposure to ambient particulate air pollution and type 2 diabetes prevalence, blood glucose and glycosylated hemoglobin levels in China. *Environ Int.* 2016 May 2;92-93:416-421. doi: 10.1016/j.envint.2016.03.028. [Epub ahead of print]

42. Eze IC, et al. Air pollution and diabetes association: Modification by type 2 diabetes genetic risk score. *Environ Int.* 2016 Jun 6;94:263-271. doi: 10.1016/j.envint.2016.04.032. [Epub ahead of print]

43. Goettems-Fiorin PB, et al. Fine particulate matter potentiates type 2 diabetes development in high-fat diet-treated mice: stress response and extracellular to intracellular HSP70 ratio analysis. *J Physiol Biochem.* 2016 Jun 29. [Epub ahead of print]

44. Wolf K, Popp A, Schneider A, Breitner S, Hampel R, Rathmann W, Herder C, Roden M, Koenig W, Meisinger C, Peters A; Association Between Long-Term Exposure to Air Pollution and Biomarkers Related to Insulin Resistance, Subclinical Inflammation and Adipokines. *Diabetes*. 2016 Sep 7. pii: db151567. [Epub ahead of print]
45. He D, et al. Association between Particulate Matter 2.5 and Diabetes Mellitus- a Meta-Analysis of Cohort Studies. *J Diabetes Investig*. 2017 Jan 25. doi: 10.1111/jdi.12631. [Epub ahead of print]
46. Alderete T, et al. Longitudinal Associations Between Ambient Air Pollution with Insulin Sensitivity, β -Cell Function, and Adiposity in Los Angeles Latino Children. *Diabetes* 2017 Jan; db161416. <https://doi.org/10.2337/db16-1416>
47. Madhloum N, et al. Cord plasma insulin and in utero exposure to ambient air pollution. *Environ Int*. 2017 May 22. pii: S0160-4120(16)30886-8. doi: 10.1016/j.envint.2017.05.012. [Epub ahead of print]
48. Strak M, et al. Long-term exposure to particulate matter, NO₂ and the oxidative potential of particulates and diabetes prevalence in a large national health survey. *Environ Int*. 2017 Sep 5;108:228-236. doi: 10.1016/j.envint.2017.08.017. [Epub ahead of print]
49. Mazidi M, et al. Ambient particulate air pollution (PM2.5) is associated with the ratio of type 2 diabetes to obesity. *Sci Rep*. 2017 Aug 22;7(1):9144. doi: 10.1038/s41598-017-08287-1.

50. Alderete TL, et al. Prenatal traffic-related air pollution exposures, cord blood adipokines and infant weight. *Pediatr Obes.* 2017 Nov 3. doi: 10.1111/ijpo.12248. [Epub ahead of print]
51. Khafaie MA, et al. Particulate matter and markers of glycemic control and insulin resistance in type 2 diabetic patients: result from Wellcome Trust Genetic study. *J Expo Sci Environ Epidemiol.* 2017 Dec 21. doi: 10.1038/s41370-017-0001-1. [Epub ahead of print]
52. Dendup T, et al. Environmental Risk Factors for Developing Type 2 Diabetes Mellitus: A Systematic Review. *Int J Environ Res Public Health.* 2018 Jan 5;15(1). pii: E78. doi: 10.3390/ijerph15010078.
53. Chen M, et al. Prenatal Exposure to Diesel Exhaust PM2.5 Causes Offspring β Cell Dysfunction in Adulthood. *Am J Physiol Endocrinol Metab.* 2017 Dec 26. doi: 10.1152/ajpendo.00336.2017. [Epub ahead of print]
54. Tan C, et al. Long-term high air pollution exposure induced metabolic adaptations in traffic policemen. *Environ Toxicol Pharmacol.* 2018 Jan 5;58:156-162. doi: 10.1016/j.etap.2018.01.002. [Epub ahead of print]
55. Wang M, et al. Association between Short-Term Exposure to Air Pollution and Dyslipidemias among Type 2 Diabetic Patients in Northwest China: A Population-Based Study. *Int J Environ Res Public Health.* 2018 Mar 30;15(4). pii: E631. doi: 10.3390/ijerph15040631.
56. Lucht SA, et al. Air Pollution and Glucose Metabolism: An Analysis in Non-Diabetic Participants of the Heinz Nixdorf Recall

Study. Environ Health Perspect. 2018 Apr 3;126(4):047001. doi: 10.1289/EHP2561.

57. Yang BY, et al. Ambient air pollution in relation to diabetes and glucose-homoeostasis markers in China: a cross-sectional study with findings from the 33 Communities Chinese Health Study. Lancet Planet Health. 2018 Feb;2(2):e64-e73. doi: 10.1016/S2542-5196(18)30001-9. Epub 2018 Feb 9.
58. Matthiessen C, et al. Long-term exposure to airborne particulate matter and NO₂ and prevalent and incident metabolic syndrome - Results from the Heinz Nixdorf Recall Study. Environ Int. 2018 Apr 10;116:74-82. doi: 10.1016/j.envint.2018.02.035. [Epub ahead of print]
59. Kim JS, et al. Longitudinal associations of in utero and early life near-roadway air pollution with trajectories of childhood body mass index. Environ Health. 2018 Sep 14;17(1):64. doi: 10.1186/s12940-018-0409-7.
60. Ding S, et al. Combined effects of ambient particulate matter exposure and a high-fat diet on oxidative stress and steatohepatitis in mice. PLoS One. 2019 Mar 28;14(3):e0214680. doi: 10.1371/journal.pone.0214680. eCollection 2019.
61. Mu L, et al. Metabolomics Profiling before, during, and after the Beijing Olympics: A Panel Study of Within-Individual Differences during Periods of High and Low Air Pollution. Environmental Health Perspectives, 2019; 127 (5): 057010 DOI: 10.1289/EHP3705
62. Hassan L, et al. The effects of ambient particulate matter on human adipose tissue. J Toxicol Environ Health A. 2019 Jun

26:1-13. doi: 10.1080/15287394.2019.1634381. [Epub ahead of print]

63. Cai L, et al. Environ Res. Effects of ambient particulate matter on fasting blood glucose among primary school children in Guangzhou, China. 2019 Jun 18;176:108541. doi: 10.1016/j.envres.2019.108541. [Epub ahead of print]

64. Wang X, et al. Evaluation of maternal exposure to PM_{2.5} and its components on maternal and neonatal thyroid function and birth weight: a cohort study. Thyroid. 2019 Jul 12. doi: 10.1089/thy.2018.0780. [Epub ahead of print]

65. Yin F, et al. Diesel Exhaust Induces Mitochondrial Dysfunction, Hyperlipidemia and Liver Steatosis. Arterioscler Thromb Vasc Biol. 2019 Jul 25;ATVBAHA119312736. doi: 10.1161/ATVBAHA.119.312736. [Epub ahead of print]

66. Klompmaker JO, et al. Associations of Combined Exposures to Surrounding Green, Air Pollution, and Road Traffic Noise with Cardiometabolic Diseases. Environ Health Perspect. 2019 Aug;127(8):87003. doi: 10.1289/EHP3857. Epub 2019 Aug 8.

67. Howe CG, et al. Association of Prenatal Exposure to Ambient and Traffic-Related Air Pollution With Newborn Thyroid Function: Findings From the Children's Health Study. JAMA Network Open, 2018 DOI: 10.1001/jamanetworkopen.2018.2172

68. Holliday KM, et al. Air pollution-associated changes in biomarkers of diabetes risk. Environ Epidemiol. 2019 Aug 13;3(4):e059. doi: 10.1097/EE9.0000000000000059. eCollection 2019 Aug.

69. IHendryx M, et al. Exposure to heavy metals from point pollution sources and risk of incident type 2 diabetes among women: a prospective cohort analysis. *Int J Environ Health Res.* 2019 Sep 19;1-12. doi: 10.1080/09603123.2019.1668545. [Epub ahead of print]
70. Ghassabian A, et al. Association of Exposure to Ambient Air Pollution With Thyroid Function During Pregnancy. *JAMA Netw Open.* 2019 Oct 2;2(10):e1912902. doi: 10.1001/jamanetworkopen.2019.12902.
71. Kim JS, et al. Associations of air pollution, obesity and cardiometabolic health in young adults: The Meta-AIR study. *Environ Int.* 2019 Oct 14;133(Pt A):105180. doi: 10.1016/j.envint.2019.105180. [Epub ahead of print]
72. Yang BY, et al. Ambient air pollution and diabetes: A systematic review and meta-analysis. *Environ Res.* 2019 Oct 12;180:108817. doi: 10.1016/j.envres.2019.108817. [Epub ahead of print]
73. Yu Y, et al. Air pollution, noise exposure, and metabolic syndrome - A cohort study in elderly Mexican-Americans in Sacramento area. *Environ Int.* 2019 Nov 25;134:105269. doi: 10.1016/j.envint.2019.105269. [Epub ahead of print]
74. Elbarbary M, et al. Ambient air pollution exposure association with diabetes prevalence and glycosylated hemoglobin (HbA1c) levels in China. Cross-sectional analysis from the WHO study of AGEing and adult health wave. *J Environ Sci Health A Tox Hazard Subst Environ Eng.* 2020 Jul 2:1-14. doi: 10.1080/10934529.2020.1787011

75. Zang ST, Luan J, Li L, Wu QJ, Chang Q, Dai HX, Zhao YH. Air pollution and metabolic syndrome risk: Evidence from nine observational studies. Environ Res. 2021 Jul 12:111546. doi: 10.1016/j.envres.2021.111546. Epub ahead of print. PMID: 34265350.
76. Bing Guo, Yuming Guo, Qucuo Nima, Yuemei Feng, Ziyun Wang, Rong Lu, Baimayangji, Yue Ma, Junmin Zhou, Huan Xu, Lin Chen, Gongbo Chen, Shanshan Li, Huan Tong, Xianbin Ding, Xing Zhao. Exposure to air pollution is associated with an increased risk of metabolic dysfunction-associated fatty liver disease. Journal of Hepatology, 2021; DOI: 10.1016/j.jhep.2021.10.016
77. Li G, Huang J, Wang J, Zhao M, Liu Y, Guo X, Wu S, Zhang L. Long-Term Exposure to Ambient PM2.5 and Increased Risk of CKD Prevalence in China. J Am Soc Nephrol. 2020 Dec 17:ASN.2020040517. doi: 10.1681/ASN.2020040517
78. Xu W, et al. The influence of PM2.5 exposure on kidney diseases. Hum Exp Toxicol. 2022 Jan-Dec;41:9603271211069982. doi: 10.1177/09603271211069982
79. Okoye OC, Carnegie E, Mora L. Air Pollution and Chronic Kidney Disease Risk in Oil and Gas- Situated Communities: A Systematic Review and Meta-Analysis. Int J Public Health. 2022 Apr 11;67:1604522. doi: 10.3389/ijph.2022.1604522. PMID: 35479765; PMCID: PMC9035494.

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Miscellaneous Health Consequences

- * Immune suppression, inflammatory bowel disease, bacterial and viral infections, lupus, juvenile arthritis, sleep apnea, and obesity are elevated in populations exposed to more air pollution.**
- *The severity, lethality, and transmissibility of COVID is increased by particulate air pollution.**
- *Air pollution can induce liver toxicity, accelerate liver inflammation and steatosis.**
- *Air pollution causes systemic oxidative stress, triggers the inflammatory chemical cascade, endothelial cell death, cytotoxicity, macrophage infiltration, and increases lipid deposition. Particulate matter penetrates intracellular structures. Air filtration leads to increased protein synthesis and enhanced mitochondrial efficiency, resulting in significant triggering of ATP synthesis and a reduction in oxidative damage.**
- *Air pollution accelerates the aging process.**
- *Air pollution increases infant mortality and SIDS.**
- * Wood smoke is uniquely toxic, the most toxic type of air pollution that most people are ever exposed to. Wildfire smoke causes dramatic increases community death rates.**
- *Osteoporosis is associated with air pollution.**

***Pollution exposure in utero or in infancy increases the likelihood of osteoarthritis and rheumatoid arthritis decades later in adulthood.**

***Lead exposure (common in urban air pollution) is associated with significant increased adult mortality primarily related to cardiovascular disease.**

***Air pollution damages the skin and corneas.**

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1. Bernatsky, S, M Fournier, CA Pineau, AE Clarke, E Vinet and A Smargiassi. 2010. Associations between ambient fine particulate levels and disease activity in systemic lupus erythematosus (SLE). Environmental Health Perspectives <http://dx.doi.org/10.1289/ehp.1002123>.
2. Dietert RR, JC DeWitt, DR Germolec and JT Zelikoff. 2010. Breaking patterns of environmentally influenced disease for health risk reduction: Immune perspectives. Environmental Health Perspectives <http://dx.doi.org/10.1289/ehp.1001971>.
3. Kaplan G, Dixon E, Panaccione R, Fong A, Chen L, et al. Effect of ambient air pollution on the incidence of appendicitis. Published online ahead of print October 5, 2009 CMAJ 10.1503/cmaj.082068
4. Bae S, Pan X-C, Kim S-Y, Park K, Kim Y-H, Kim H, et al. 2010. Exposures to Particulate Matter and Polycyclic Aromatic Hydrocarbons and Oxidative Stress in Schoolchildren. Environ Health Perspect 118:579-583. doi:10.1289/ehp.0901077

5. Geiser M, Rothen-Rutishauser B, Kapp N, Schürch S, Kreyling W, Schulz H, et al. 2005. Ultrafine Particles Cross Cellular Membranes by Nonphagocytic Mechanisms in Lungs and in Cultured Cells. *Environ Health Perspect* 113:1555-1560.
doi:10.1289/ehp. 8006
6. Dioni L, Hoxha M, Nordio F, Bonzini M, Tarantini L, Albetti B, Savarese A, Schwartz J, Bertazzi PA, Apostoli P, Hou L, Baccarelli A. Effects of Short-Term Exposure to Inhalable Particulate Matter on Telomere Length, Telomerase Expression and Telomerase Methylation in Steel Workers. *Environ Health Perspect*. 2010 Dec 17. [Epub ahead of print]
7. Zeft AS, Prahala S, Lefevre S, et al. Juvenile idiopathic arthritis and exposure to fine particulate air pollution. *Clin Exp Rheumatol* 2009 Sep-Oct; 27(5):877-84
8. Zanobetti A, Redline S, Schwartz J, et al. Associations of PM 10 with sleep and sleep-disordered breathing in adults from seven US urban areas. *Am J Respir Crit Care Med* 2010 Sept 15;182(6):819-25
9. Kim C, et al. Ambient Particulate Matter as a Risk Factor for Suicide. *Am J Psychiatry*, Sep 2010; 167: 1100 - 1107.
10. Kuo C, Chen V, Lee W, et al. Asthma and Suicide Mortality in Young People: A 12- Year Follow-Up Study. *Am J Psychiatry*, Sep 2010; 167: 1092 - 1099.
11. Scheers H, Mwalili SM, Faes C, Fierens F, Nemery B, Nawrot TS 2011. Does Air Pollution Trigger Infant Mortality in Western Europe? A Case-Crossover Study. *Environ Health Perspect* :-.
doi:10.1289/ehp.1002913

12. McCracken J, Baccarelli A, Hoxha M, Dioni L, Melly S, Coull B, Suh H, Vokonas P, Schwartz J. Annual ambient black carbon associated with shorter telomeres in elderly men: Veterans Affairs Normative Aging Study. *Environ Health Perspect*. 2010 Nov; 118(11):1564-70.
13. Xu Z, Xu X, Zhong M, Hotchkiss IP, Lewandowski RP, Wagner JG, Bramble LA, Yang Y, Wang A, Harkema JR, Lippmann M, Rajagopalan S, Chen LC, Sun Q. Ambient Particulate Air Pollution Induces Oxidative Stress and Alterations of Mitochondria and Gene Expression in Brown and White Adipose Tissues. *Part Fibre Toxicol*. 2011 Jul 11;8(1):20. [Epub ahead of print]
14. Lodovici M, Bigagli E. Oxidative stress and air pollution exposure. *J Toxicol*. 2011;2011:487074. Epub 2011 Aug 13.
15. Risom L, Møller P, Loft S. Oxidative stress-induced DNA damage by particulate air pollution. *Mutat Res*. 2005 Dec 30;592(1-2):119-37. Epub 2005 Aug 8.
16. Williams L, Ulrich CM, Larson T, Wener MH, Wood B, Chen-Levy Z, Campbell PT, Potter J, McTiernan A, De Roos AJ. Fine Particulate Matter (PM_{2.5}) Air Pollution and Immune Status Among Women in the Seattle Area. *Arch Environ Occup Health*. 2011 Jul-Sep;66(3):155-65.
17. Wisnivesky JP, Teitelbaum SL, Todd AC, Boffetta P, Crane M, Crowley L, de la Hoz RE, Dellenbaugh C, Harrison D, Herbert R, Kim H, Jeon Y, Kaplan J, Katz C, Levin S, Luft B, Markowitz S, Moline JM, Ozbay F, Pietrzak RH, Shapiro M, Sharma V, Skloot G, Southwick S, Stevenson LA, Udasin I, Wallenstein S, Landrigan PJ. Persistence of multiple illnesses in World Trade Center rescue and recovery workers: a cohort study. *Lancet*. 2011 Sep 3;378(9794):888-97.

18. Jordan HT, Brackbill RM, Cone JE, Debchoudhury I, Farfel MR, Greene CM, Hadler JL, Kennedy J, Li J, Liff J, Stayner L, Stellman SD. Mortality among survivors of the Sept 11, 2001, World Trade Center disaster: results from the World Trade Center Health Registry cohort. *Lancet*. 2011 Sep 3;378(9794):879-87.
19. Ghio AJ, Carraway MS, Madden MC. Composition of air pollution particles and oxidative stress in cells, tissues, and living systems. *J Toxicol Environ Health B Crit Rev*. 2012 Jan;15(1):1-21.
20. Song JJ, Lee JD, Lee BD, Chae SW, Park MK. Effect of diesel exhaust particles on human middle ear epithelial cells. *Int J Pediatr Otorhinolaryngol*. 2011 Dec 29. [Epub ahead of print]
21. Bertoldi M, Borgini A, Tittarelli A, Fattore E, Cau A, Fanelli R, Crosignani P. Health effects for the population living near a cement plant: An epidemiological assessment. *Environ Int*. 2012 Jan 13;41C:1-7. [Epub ahead of print]
22. Gump, BB, JA MacKenzie, AK Dumas, CD Palmer, PJ Parsons, ZM Segu, YS Mechref and KG Bendinskas. Fish consumption, low-level mercury, lipids and inflammatory markers in children. *Environmental Research* <http://dx.doi.org/10.1016/j.envres.2011.10.002>.
23. Amatullah H, North ML, Akhtar US, Rastogi N, Urch B, Silverman FS, Chow CW, Evans GJ, Scott JA. Comparative cardiopulmonary effects of size-fractionated airborne particulate matter. *Inhal Toxicol*. 2012 Feb 23. [Epub ahead of print]
25. Kloog I, Coull B, Zanobetti A, Koutrakis P, Schwartz J. Acute and Chronic Effects of Particles on Hospital Admissions in

New-England. PLoS ONE, 2012; 7 (4): e34664 DOI: 10.1371/journal.pone.0034664

26. Büchner N, Ale-Yagha N, Jakob S, Sydlik U, Kunze K, Unfried K, Altschmied J, Haendeler J. Unhealthy diet and ultrafine carbon black particles induce senescence and disease associated phenotypic changes. *Exp Gerontol.* 2012 Apr 6. [Epub ahead of print]
27. Lim YH, Kim H, Kim JH, Bae S, Park HY, Hong YC. Air Pollution and Depressive Symptoms in Elderly Adults. *Environ Health Perspect.* 2012 Apr 18. [Epub ahead of print]
28. Pasanen K, Eero P, Turunen A, Patama T, Jussila I, Makkonen S, Salonen, R, Verkasalo, P. Mortality Among Population With Exposure to Industrial Air Pollution Containing Nickel and Other Toxic Metals. *Journal of Occupational & Environmental Medicine.* May 2012 - Volume 54 - Issue 5 - p 583–591 doi: 10.1097/JOM. 0b013e3182492050
29. Xu X, Deng F, Guo X, Lv P, Zhong M, Liu C, Wang A, Tzan K, Jiang SY, Lippmann M, Rajagopalan S, Qu Q, Chen LC, Sun Q. Association of Systemic Inflammation with Marked Changes in Particulate Air Pollution in Beijing in 2008. *Toxicol Lett.* 2012 May 19. [Epub ahead of print]
30. Grahame TJ, Schlesinger RB. Oxidative Stress-Induced Telomeric Erosion as a Mechanism Underlying Airborne Particulate Matter-Related Cardiovascular Disease. *Part Fibre Toxicol.* 2012 Jun 19;9(1):21. [Epub ahead of print]
31. Berman JD, Fann N, Hollingsworth JW, Pinkerton KE, Rom WN, Szema AM, et al. 2012. Health Benefits from Large Scale

Ozone Reduction in the United States. Environ Health Perspect
:-. <http://dx.doi.org/10.1289/ehp.1104851>

32. Atkinson RW, Yu D, Armstrong BG, Pattenden S, Wilkinson P, Doherty RM, et al. 2012. Concentration-Response Function for Ozone and Daily Mortality: Results from Five Urban and Five Rural UK Populations. Environ Health Perspect :-.
<http://dx.doi.org/10.1289/ehp.1104108>

33. Tong, H, AG Rappold, D Diaz-Sanchez, SE Steck, J Berntsen, WE Cascio, et al. 2012. Omega-3 fatty acid supplementation appears to attenuate particulate air pollution induced cardiac effects and lipid changes in healthy middle-aged adults. Environmental Health Perspective
[http://dx.doi.org/10.1289/ehp.1104472.](http://dx.doi.org/10.1289/ehp.1104472)

34. Madrigano J, Baccarelli A, Mittleman M, et al. Air Pollution and DNA Methylation: Interaction by Psychological Factors in the VA Normative Aging Study. Am. J. Epidemiol. (2012) 176 (3): 224-232. doi: 10.1093/aje/kwr523

35. Sancini A, Tomei F, Gioffrè PA, Sinibaldi F, Corbosiero P, Rinaldi G, Marrocco M, Scimitto L, Fiaschetti M, Tomei G, Ciarrocca M. Occupational exposure to traffic pollutants and peripheral blood counts. Ann Ig. 2012 Jul-Aug;24(4):325-44.

36. Huang W, Wang G, Lu SE, Kipen H, Wang Y, Hu M, Lin W, Rich D, Ohman-Strickland P, Diehl SR, Zhu P, Tong J, Gong J, Zhu T, Zhang J. Inflammatory and Oxidative Stress Responses of Healthy Young Adults to Changes in Air Quality during the Beijing Olympics. Am J Respir Crit Care Med. 2012 Aug 30. [Epub ahead of print]

37. Valdés A, Zanobetti A, Halonen J, Cifuentes L, Morata D, Schwartz J. Elemental concentrations of ambient particles and cause specific mortality in Santiago, Chile: a time series study. *Environmental Health* 2012; 11:82 doi:10.1186/1476-069X-11-82
38. Zhao J, Gao Z, Tian Z, Xie Y, Xin F, Jiang R, Kan H, Song W. The biological effects of individual-level PM_{2.5} exposure on systemic immunity and inflammatory response in traffic policemen. *Occup Environ Med.* 2013 Jan 15. [Epub ahead of print]
39. Fuller CH, Brugge D, Williams PL, Mittleman MA, Lane K, Durant JL, Spengler JD. Indoor and outdoor measurements of particle number concentration in near-highway homes. *J Expo Sci Environ Epidemiol.* 2013 Jan 16. doi: 10.1038/jes.2012.116. [Epub ahead of print]
40. Byron Lew, B. Mak Arvin. Happiness and air pollution: evidence from 14 European countries. *International Journal of Green Economics*, 2013 (in press)
41. Migliaccio CT, Kobos E, King QO, Porter V, Jessop F, Ward T. Adverse effects of wood smoke PM(2.5) exposure on macrophage functions. *Inhal Toxicol.* 2013 Feb; 25(2):67-76. doi: 10.3109/08958378.2012.756086.
42.
YuanZ,ChenY,ZhangY,LiuH,LiuQ,ZhaoJ,HuM,HuangW,WangG,ZhuT, Zhang J, Zhu P. Changes of plasma vWF level in response to the improvement of air quality: an observation of 114 healthy young adults. *Ann Hematol.* 2013 Jan 29. [Epub ahead of print]
43. Cupr P, Flegrová Z, Francu J, Landlová L, Klánová J. Mineralogical, chemical and toxicological characterization of

urban air particles. Environ Int. 2013 Feb 2;54C:26-34. doi: 10.1016/j.envint.2012.12.012. [Epub ahead of print]

44. Liu J, Zhang L, Winterroth LC, Garcia M, Weiman S, Wong JW, Sunwoo JB, Nadeau KC. Epigenetically mediated pathogenic effects of phenanthrene on regulatory T cells. J Toxicol. 2013;2013:967029. doi: 10.1155/2013/967029. Epub 2013 Mar 7.

45. Reyes M, Díaz J, Tobias A, Montero JC, Linares C. Impact of Saharan dust particles on hospital admissions in Madrid (Spain). Int J Environ Health Res. 2013 Apr 2. [Epub ahead of print]

46. Mendez R, Zheng Z, Fan Z, Rajagopalan S, Sun Q, Zhang K. Exposure to fine airborne particulate matter induces macrophage infiltration, unfolded protein response, and lipid deposition in white adipose tissue. Am J Transl Res. 2013;5(2):224-34. Epub 2013 Mar 28.

47. Lue S, Wellenius G, Wilker E, Mostofsky E, Mittleman M. Residential proximity to major roadways and renal function. J Epidemiol Community Health Published Online First: 13 May 2013 doi:10.1136/jech-2012-202307

48. Peng RD, Samoli E, Pham L, Dominici F, Touloumi G, Ramsay T, Burnett RT, Krewski D, Le Tertre A, Cohen A, Atkinson RW, Anderson HR, Katsouyanni K, Samet JM. Acute effects of ambient ozone on mortality in Europe and North America: results from the APHEA study. Air Qual Atmos Health. 2013 Jun 1;6(2):445-453.

49. Calderón-Garcidueñas L, Mora-Tiscareño A, Franco-Lira M, Cross JV, Engle R, Aragón-Flores M, Gómez-Garza G, Jewells V, Medina-Cortina H, Solorio E, Chao CK, Zhu H, Mukherjee PS, Ferreira-Azevedo L, Torres-Jardón R, D'Angiulli A. Flavonol-rich

dark cocoa significantly decreases plasma endothelin-1 and improves cognition in urban children. *Front Pharmacol.* 2013 Aug 22;4:104. doi: 10.3389/fphar.2013.00104.

50. Beamish LA, Osornio-Vargas AR, Wine E. Air pollution: An environmental factor contributing to intestinal disease. *J Crohns Colitis.* 2011 Aug;5(4):279-86. doi: 10.1016/j.crohns.2011.02.017. Epub 2011 Mar 23.

51. Kaplan GG, Hubbard J, Korzenik J, Sands BE, Panaccione R, Ghosh S, Wheeler AJ, Villeneuve PJ. The inflammatory bowel diseases and ambient air pollution: a novel association. *Am J Gastroenterol.* 2010 Nov;105(11):2412-9. doi: 10.1038/ajg.2010.252. Epub 2010 Jun 29.

52. Ananthakrishnan AN, McGinley EL, Binion DG, Saeian K. Ambient air pollution correlates with hospitalizations for inflammatory bowel disease: an ecologic analysis. *Inflamm Bowel Dis.* 2011 May;17(5):1138-45. doi: 10.1002/ibd.21455. Epub 2010 Aug 30.

53. Kish L, Hotte N, Kaplan GG, Vincent R, Tso R, et al. (2013) Environmental Particulate Matter Induces Murine Intestinal Inflammatory Responses and Alters the Gut Microbiome. *PLoS ONE* 8(4): e62220. doi:10.1371/journal.pone.0062220

54. Slama R, Bottagisi S, Solansky I, Lepeule J, Giorgis-Allemand L, Sram R. Short- Term Impact of Atmospheric Pollution on Fecundability. *Epidemiology.* 2013 Sep 18. [Epub ahead of print]

55. Ortiz L, Nakamura B, Li X, Blumberg B, Luderer U. In Utero Exposure to Benzo[a]pyrene Increases Adiposity and Causes Hepatic Steatosis in Female Mice, and Glutathione Deficiency Is

Protective. *Toxicol Lett.* 2013 Oct 6. pii: S0378-4274(13)01340-4. doi: 10.1016/j.toxlet.2013.09.017. [Epub ahead of print]

56. Cimino F, Speciale A, Siracusa L, Naccari C, Saija A, Mancari F, Raciti R, Cristani M, Trombetta D. Cytotoxic effects induced in vitro by organic extracts from urban air particulate matter in human leukocytes. *Drug Chem Toxicol.* 2013 Nov 6. [Epub ahead of print]

57. Eum K, Weisskopf M, Nie L, Hu H, Korrick S. Cumulative Lead Exposure and Age at Menopause in the Nurses' Health Study Cohort. *Environ Health Perspect*; DOI: 10.1289/ehp.1206399

58. Song Y, Ichinose T, Morita K, Nakanishi T, Kanazawa T, Yoshida Y. Asian sand dust causes subacute peripheral immune modification with NF- κ B activation. *Environ Toxicol.* 2013 Dec 5. doi: 10.1002/tox.21931. [Epub ahead of print]

59. Parajulee A, Wania F. Evaluating officially reported polycyclic aromatic hydrocarbon emissions in the Athabasca oil sands region with a multimedia fate model. *Proceedings of the National Academy of Sciences*, 2014; DOI: 10.1073/pnas. 1319780111

60. Brochu P, Bouchard M, Haddad S. Physiological Daily Inhalation Rates for Health Risk Assessment in Overweight/Obese Children, Adults, and Elderly. *Risk Analysis*, 2013; DOI: 10.1111/risa.12125

61. Zanobetti A¹, Austin E², Coull BA³, Schwartz J², Koutrakis P². Health effects of multi-pollutant profiles. *Environ Int.* 2014 Jun 17;71C:13-19. doi: 10.1016/j.envint. 2014.05.023. [Epub ahead of print]

62. Garcia CC, Freitas FP, Sanchez AB, Di Mascio P, Medeiros MH. Elevated α-methyl-γ-hydroxy-1,N2-propano-2'-deoxyguanosine levels in urinary samples from individuals exposed to urban air pollution. *Chem Res Toxicol.* 2013 Nov 18;26(11): 1602-4. doi: 10.1021/tx400273q. Epub 2013 Nov 6.
63. De Roos AJ, Koehoorn M, Tamburic L, Davies HW, Brauer M. Proximity to Traffic, Ambient Air Pollution, and Community Noise in Relation to Incident Rheumatoid Arthritis. *Environ Health Perspect.* 2014 Jun 6. [Epub ahead of print]
64. Kim JW, Park S, Lim CW, Lee K, Kim B. The role of air pollutants in initiating liver disease. *Toxicol Res.* 2014 Jun;30(2):65-70. doi: 10.5487/TR.2014.30.2.065.
65. Mahalingaiah S, Hart J, Laden F, Terry K, Boynton-Jarrett R, Aschengrau A, Missmer S. Air Pollution and Risk of Uterine Leiomyomata. *Epidemiology:* September 2014 - Volume 25 - Issue 5 - p 682-688 doi: 10.1097/EDE.0000000000000126.
66. Awji EG, Chand H, Bruse S, Smith KR, Colby JK, Mebratu Y, Levy BD, Tesfaigzi Y. Wood Smoke Enhances Cigarette Smoke-Induced Inflammation by Inducing the Aryl Hydrocarbon Receptor Repressor in Airway Epithelial Cells. *Am J Respir Cell Mol Biol.* 2014 Aug 19. [Epub ahead of print]
67. Frutos V, González-Comadrán M, Solà I, Jacquemin B, Carreras R, Checa Vizcaíno MA. Impact of air pollution on fertility: a systematic review. *Gynecol Endocrinol.* 2014 Sep 12:1-7. [Epub ahead of print]

68. Edwards PM, et al. High winter ozone pollution from carbonyl photolysis in an oil and gas basin. *Nature*. 2014 Oct 1. doi: 10.1038/nature13767. [Epub ahead of print]
69. Rylance J, et al. Household Air Pollution Causes Dose-dependent Inflammation and Altered Phagocytosis in Human Macrophages. *Am J Respir Cell Mol Biol*. 2014 Sep 25. [Epub ahead of print]
70. Saffari A, Daher N, Shafer MM, Schauer JJ, Sioutas C. Global perspective on the oxidative potential of airborne particulate matter: a synthesis of research findings. *Environ Sci Technol*. 2014 Jul 1;48(13):7576-83. doi: 10.1021/es500937x. Epub 2014 Jun 10.
71. Rengaraj D, Kwon WS, Pang MG. Effects of motor vehicle exhaust on male reproductive function and associated proteins. *J Proteome Res*. 2014 Oct 20. [Epub ahead of print]
72. Macey GP, Breech R, Chernaik M, Cox C, Larson D, Thomas D, Carpenter DO. Air concentrations of volatile compounds near oil and gas production: a community- based exploratory study. *Environ Health*. 2014 Oct 30;13:82. doi: 10.1186/1476-069X-13-82.
73. McConnell R, Shen E, Gilliland FD, Jerrett M, Wolch J, Chang CC, Lurmann F, Berhane K. A Longitudinal Cohort Study of Body Mass Index and Childhood Exposure to Secondhand Tobacco Smoke and Air Pollution: The Southern California Children's Health Study. *Environ Health Perspect*. 2014 Nov 12. [Epub ahead of print]
74. Kheirandish-Gozal L, Ghalebandi M, Salehi M, Salarifar MH, Gozal D. Neighbourhood air quality and snoring in school-aged

children. Eur Respir J. 2014 Mar; 43(3):824-32.
doi:10.1183/09031936.00113113. Epub 2013 Aug 29.

75. Bakian AV, Huber RS, Coon H, Gray D, Wilson P, McMahon WM, Renshaw PF. Acute Air Pollution Exposure and Risk of Suicide Completion. Am J Epidemiol. 2015 Feb 10. pii: kwu341. [Epub ahead of print]

76. Chen Z, Salam MT, Karim R, Toledo-Corral CM, Watanabe RM, Xiang AH, Buchanan TA, Habre R. Living near a freeway is associated with lower bone mineral density among Mexican Americans. Osteoporos Int. 2015 Feb 13. [Epub ahead of print]

77. Shen G, et al. Emission and Size Distribution of Particle-bound Polycyclic Aromatic Hydrocarbons from Residential Wood Combustion. Biomass Bioenergy. 2014 Aug;55:141-147.

78. McEachran AD, Blackwell BR, Hanson JD, Wooten KJ, Mayer GD, Cox SB, Smith PN. Antibiotics, Bacteria, and Antibiotic Resistance Genes: Aerial Transport from Cattle Feed Yards via Particulate Matter. Environ Health Perspect. 2015 Jan 22. [Epub ahead of print]

79. Díaz-Roblesa, LA, et al. Health risks caused by short term exposure to ultrafine particles generated by residential wood combustion: A case study of Temuco, Chile. Environment International. Volume 66, May 2014, Pages 174–181

80. Kioumourtzoglou MA, Austin E, Koutrakis P, Dominici F, Schwartz J, Zanobetti A. PM2.5 and Survival Among Older Adults: Effect Modification by Particulate Composition. Epidemiology. 2015 Feb 25. [Epub ahead of print]

81. Calderón-Garcidueñas L, et al. Mexico City normal weight children exposed to high concentrations of ambient PM_{2.5} show high blood leptin and endothelin-1, vitamin D deficiency, and food reward hormone dysregulation versus low pollution controls. Relevance for obesity and Alzheimer disease. *Environ Res.* 2015 May 30;140:579-592. doi: 10.1016/j.envres.2015.05.012. [Epub ahead of print]
82. Héroux ME, et al. Quantifying the health impacts of ambient air pollutants: recommendations of a WHO/Europe project. *Int J Public Health.* 2015 May 30. [Epub ahead of print]
83. Cui Y, et al. Ambient Fine Particulate Matter Suppresses In Vivo Proliferation of Bone Marrow Stem Cells through Reactive Oxygen Species Formation. *PLoS One.* 2015 Jun 9;10(6):e0127309. doi: 10.1371/journal.pone.0127309. eCollection 2015.
84. Lanki T, et al. Air Pollution from Road Traffic and Systemic Inflammation in Adults: A Cross-Sectional Analysis in the European ESCAPE Project. *Environ Health Perspect;* DOI:10.1289/ehp.1408224
85. Woodruff T, et al. Air Pollution and Postneonatal Infant Mortality in the United States, 1999–2002 *Environ Health Perspect.* 2008 Jan; 116(1): 110–115. Published online 2007 Oct 24. doi: 10.1289/ehp.10370
86. Shim SR, Kim JH, Song YS, Lee WJ. Association between Air Pollution and Benign Prostatic Hyperplasia: An Ecological Study. *Arch Environ Occup Health.* 2015 Sep 17:0. [Epub ahead of print]

87. Reed J, Dela Cruz AL, Lomnicki SM, Backes WL. Environmentally persistent free radical-containing particulate matter competitively inhibits metabolism by cytochrome P450 1A2. *Toxicol Appl Pharmacol.* 2015 Sep 27. pii: S0041-008X(15)30095-8. doi: 10.1016/j.taap.2015.09.021. [Epub ahead of print]
88. McGrath JM, et al. An analysis of ozone damage to historical maize and soybean yields in the United States. *Proc Natl Acad Sci U S A.* 2015 Nov 17;112(46):14390-5. doi: 10.1073/pnas.1509777112. Epub 2015 Nov 2.
89. Pieters N, et al. Biomolecular Markers Within the Core Axis of Aging and Particulate Air Pollution Exposure in the Elderly: A Cross-Sectional Study. *Environ Health Perspect.* 2015 Dec 15. [Epub ahead of print]
90. Miller D, et al. Ozone Exposure Increases Circulating Stress Hormones and Lipid Metabolites in Humans. *Am J Respir Crit Care Med.* 2016 Jan 8. [Epub ahead of print]
91. Singleton B, et al. Environmental stress in the Gulf of Mexico and its potential impact on public health. *Environ Res.* 2015 Dec 30;146:108-115. doi: 10.1016/j.envres.2015.12.019. [Epub ahead of print]
92. Feng C, Li J, Sun W, Zhang Y, Wang Q. Impact of ambient fine particulate matter (PM2.5) exposure on the risk of influenza-like-illness: a time-series analysis in Beijing, China. *Environ Health.* 2016 Feb 11;15(1):17. doi: 10.1186/s12940-016-0115-2.
93. Burchiel SW, et al. Changes in HPBMC markers of immune function following controlled short-term inhalation exposures of

humans to hardwood smoke. *Inhal Toxicol.* 2016 Feb;28(2):61-70.

94. Li W, et al. Short-Term Exposure to Air Pollution and Biomarkers of Oxidative Stress: The Framingham Heart Study. *J Am Heart Assoc.* 2016 Apr 28;5(5). pii: e002742. doi: 10.1161/JAHA.115.002742.
95. Reid CE, et al. Critical Review of Health Impacts of Wildfire Smoke Exposure. *Environ Health Perspect.* 2016 Apr 15. [Epub ahead of print]
96. Nucci P, et al. Pediatric Conjunctivitis and Air Pollution Exposure: A Prospective Observational Study. *Semin Ophthalmol.* 2016 Apr 15:1-5. [Epub ahead of print]
97. Cox B, Gasparrini A, Catry B, Fierens F, Vangronsveld J, Nawrot TS. Ambient Air Pollution-Related Mortality in Dairy Cattle: Does It Corroborate Human Findings? *Epidemiology.* 2016 Jul 27. [Epub ahead of print]
98. Kollanus V, Prank M, Gens A, Soares J, Vira J, Kukkonen J, Sofiev M, Salonen RO, Lanki T. Mortality due to Vegetation-Fire Originated PM_{2.5} Exposure in Europe - Assessment for the Years 2005 and 2008. *Environ Health Perspect.* 2016 Jul 29. [Epub ahead of print]
99. Leggy J, et al. Oil sands operations as a large source of secondary organic aerosols *Nature* (2016) doi:10.1038/nature17646
100. Dédelé A, et al. Seasonal variation of indoor and outdoor air quality of nitrogen dioxide in homes with gas and electric

stoves. *Environ Sci Pollut Res Int.* 2016 Jun 1. [Epub ahead of print]

101. Jung CR, et al. Ambient Air Pollutant Exposures and Hospitalization for Kawasaki Disease in Taiwan: A Case-Crossover Study (2000-2010) *Environ Health Perspect*; DOI:10.1289/EHP137
102. White A, et al. Antimüllerian hormone (AMH) in relation to tobacco and marijuana use and sources of indoor heating/cooking. *Fertil Steril.* 2016 May 27. pii: S0015-0282(16)61282-7. doi: 10.1016/j.fertnstert.2016.05.015. [Epub ahead of print]
103. Bourciera L, et al. Experimental evidence of biomass burning as a source of atmospheric ^{137}Cs , puy de Dôme (1465 m a.s.l.), France. *Atmospheric Environment.* Volume 44, Issue 19, June 2010, Pages 2280–2286
104. Ostro B, Malig B, Hasheminassab S, Berger K, Chang E, Sioutas C. Associations of Source-Specific Fine Particulate Matter With Emergency Department Visits in California. *Am J Epidemiol.* 2016 Sep 6. pii: kwv343. [Epub ahead of print]
105. Zeft AS, et al. Systemic onset juvenile idiopathic arthritis and exposure to fine particulate air pollution. *Clin Exp Rheumatol.* 2016 Sep 1. [Epub ahead of print]
106. Uni D, et al. Airborne dust absorption by semi-arid forests reduces PM pollution in nearby urban environments. *Sci Total Environ.* 2017 Apr 29;598:984-992. doi: 10.1016/j.scitotenv.2017.04.162. [Epub ahead of print]

107. Huang JV, Leung GM, Schooling CM. The Association of Air Pollution With Pubertal Development: Evidence From Hong Kong's "Children of 1997" Birth Cohort. *Am J Epidemiol.* 2017 Apr 21;1-10. doi: 10.1093/aje/kww200. [Epub ahead of print]
108. Kim YM, Kim J, Han YI, Jeon BH, Cheong HK, Ahn K. Short-term effects of weather and air pollution on atopic dermatitis symptoms in children: A panel study in Korea. *PLoS One.* 2017 Apr 6;12(4):e0175229. doi: 10.1371/journal.pone.0175229. eCollection 2017.
109. van der Sloot KWJ, Amini M, Peters V, Dijkstra G, Alizadeh BZ. Inflammatory Bowel Diseases: Review of Known Environmental Protective and Risk Factors Involved. *Inflamm Bowel Dis.* 2017 Aug 2. doi: 10.1097/MIB.0000000000001217. [Epub ahead of print]
110. van der Sloot KWJ, Amini M, Peters V, Dijkstra G, Alizadeh BZ. Inflammatory Bowel Diseases: Review of Known Environmental Protective and Risk Factors Involved. *Inflamm Bowel Dis.* 2017 Aug 2. doi: 10.1097/MIB.0000000000001217. [Epub ahead of print]
111. Psoter KJ, De Roos AJ, Wakefield J, Mayer JD, Rosenfeld M. Air pollution exposure is associated with MRSA acquisition in young U.S. children with cystic fibrosis. *BMC Pulm Med.* 2017 Jul 27;17(1):106. doi: 10.1186/s12890-017-0449-8.
112. Li W, et al. Short-Term Exposure to Ambient Air Pollution and Biomarkers of Systemic Inflammation: The Framingham Heart Study. *Arterioscler Thromb Vasc Biol.* 2017 Jul 27. pii: ATVBBAHA.117.309799. doi: 10.1161/ATVBBAHA.117.309799. [Epub ahead of print]

113. Vreeland H, et al. Oxidative potential of PM 2.5 during Atlanta rush hour: Measurements of in-vehicle dithiothreitol (DTT) activity. *Atmospheric Environment*. 2017; 165: 169 DOI: 10.1016/j.atmosenv.2017.06.044
114. Merklinger-Gruchala A, et al. Effect of Air Pollution on Menstrual Cycle Length-A Prognostic Factor of Women's Reproductive Health. *Int J Environ Res Public Health*. 2017 Jul 20;14(7). pii: E816. doi: 10.3390/ijerph14070816.
115. Hsieh S, et al. Traffic-related air pollution associations with cytokeratin-18, a marker of hepatocellular apoptosis, in an overweight and obese paediatric population. *Pediatr Obes*. 2017 Jul 20. doi: 10.1111/ijpo.12228. [Epub ahead of print]
116. Wu XM, et al. Association between gaseous air pollutants and inflammatory, hemostatic and lipid markers in a cohort of midlife women. *Environ Int*. 2017 Jul 18;107:131-139. doi: 10.1016/j.envint.2017.07.004. [Epub ahead of print]
117. Girguis MS, et al. Chronic PM2.5 exposure and risk of infant bronchiolitis and otitis media clinical encounters. *Int J Hyg Environ Health*. 2017 Jul 1. pii: S1438-4639(17)30219-5. doi: 10.1016/j.ijheh.2017.06.007. [Epub ahead of print]
118. Nuvolone D, Petri D, Voller F. The effects of ozone on human health. *Environ Sci Pollut Res Int*. 2017 May 25. doi: 10.1007/s11356-017-9239-3. [Epub ahead of print]
119. Li H, et al. Particulate Matter Exposure and Stress Hormone Levels: A Randomized, Double-Blind, Crossover Trial of Air Purification
<https://doi.org/10.1161/CIRCULATIONAHA.116.026796>
Circulation. 2017;136:618-627

120. Wang C, et al. Acute Inflammation Following Personal Exposure to Fine-particulate Air Pollution. *Am J Epidemiol.* 2017 Aug 17. doi: 10.1093/aje/kwx277. [Epub ahead of print]
121. Bowe B, et al. Particulate Matter Air Pollution and the Risk of Incident CKD and Progression to ESRD. *J Am Soc Nephrol.* 2017 Sep 21. pii: ASN.2017030253. doi: 10.1681/ASN.2017030253. [Epub ahead of print]
122. Blount, R, et al. Traffic-Related Air Pollution and All-Cause Mortality during Tuberculosis Treatment in California. *Environ Health Perspect*; DOI:10.1289/EHP1699
123. Son JY, et al. Pregnancy and Lifetime Exposure to Fine Particulate Matter and Infant Mortality in Massachusetts, 2001-2007. *Am J Epidemiol.* 2017 Nov 7:1-9. doi: 10.1093/aje/kwx015. [Epub ahead of print]
124. Prada, D, Zhong, J, Colicino, E et al. Association of air particulate pollution with bone loss over time and bone fracture risk: analysis of data from two independent studies. *Lancet Planet Health.* 2017; 1: e337–e347
125. Zhao R, et al. Nasal epithelial barrier disruption by particulate matter $\leq 2.5 \mu\text{m}$ via tight junction protein degradation. *J Appl Toxicol.* 2017 Dec 13. doi: 10.1002/jat.3573. [Epub ahead of print]
126. França C, et al. Risk Factors Associated with Juvenile Idiopathic Arthritis: Exposure to Cigarette Smoke and Air Pollution from Pregnancy to Disease Diagnosis. *J Rheumatol.*

2017 Nov 15. pii: jrheum.161500. doi: 10.3899/jrheum.161500. [Epub ahead of print]

127. Alves AGF, et al. Influence of air pollution on airway inflammation and disease activity in childhood-systemic lupus erythematosus. *Clin Rheumatol*. 2017 Nov 2. doi: 10.1007/s10067-017-3893-1. [Epub ahead of print]
128. Borghini A, et al. Environmental Pollution by Benzene and PM10 and Clinical Manifestations of Systemic Sclerosis: A Correlation Study. *Int J Environ Res Public Health*. 2017 Oct 26;14(11). pii: E1297. doi: 10.3390/ijerph14111297.
129. de Zwart F, et al. Air Pollution and Performance-Based Physical Functioning in Dutch Older Adults. *Environ Health Perspect*. 2018 Jan 19;126(1):017009. doi: 10.1289/EHP2239.
130. Markandya A, et al. Health co-benefits from air pollution and mitigation costs of the Paris Agreement: a modeling study. *Lancet Planet Health*. 2018 Mar;2(3):e126-e133. doi: 10.1016/S2542-5196(18)30029-9. Epub 2018 Mar 2.
131. Chen R, et al. Associations between ambient nitrogen dioxide and daily cause-specific mortality: Evidence from 272 Chinese cities. *Epidemiology*. 2018 Apr 4. doi: 10.1097/EDE.0000000000000829. [Epub ahead of print]
132. Bean JK, et al. Formation of Particulate Matter from the Oxidation of Evaporated Hydraulic Fracturing Wastewater. *Environ Sci Technol*. 2018 Mar 29. doi: 10.1021/acs.est.7b06009. [Epub ahead of print]
133. Li D, et al. Association between short-term exposure to ambient air pollution and daily mortality: a time-series study in

Eastern China. Environ Sci Pollut Res Int. 2018 Mar 29. doi: 10.1007/s11356-018-1759-y. [Epub ahead of print]

134. Lanphear B, et al. Low-level lead exposure and mortality in US adults: a population-based cohort study. The Lancet Public Health, 2018 DOI: 10.1016/S2468-2667(18)30025-2
135. Huang J, Pan X, Guo X, Li G. Impacts of air pollution wave on years of life lost: A crucial way to communicate the health risks of air pollution to the public. Environ Int. 2018 Jan 29;113:42-49. doi: 10.1016/j.envint.2018.01.022. [Epub ahead of print] PMID: 29421406 [PubMed - as supplied by publisher]
136. Cromar KR, Gladson LA, Ghazipura M, Ewart G. ATS and Marron Institute Report: Estimated Excess Morbidity and Mortality Associated with Air Pollution above ATS-Recommended Standards, 2013-2015. Ann Am Thorac Soc. 2018 Feb 9. doi: 10.1513/AnnalsATS.201710-785EH. [Epub ahead of print] No abstract available. PMID: 29425050 [PubMed - as supplied by publisher]
137. Mutlu EA, et al. Inhalational exposure to particulate matter air pollution alters the composition of the gut microbiome. Environ Pollut. 2018 May 18;240:817-830. doi: 10.1016/j.envpol.2018.04.130. [Epub ahead of print]
138. Malmqvist E, et al. Estimated health benefits of exhaust free transport in the city of Malmö, Southern Sweden. Environment International, 2018; 118: 78 DOI: 10.1016/j.envint.2018.05.035
139. Yitshak-Sade M, et al. The association between short and long-term exposure to PM_{2.5} and temperature and hospital admissions in New England and the synergistic effect of the

short-term exposures. *Sci Total Environ.* 2018 Oct 15;639:868-875. doi: 10.1016/j.scitotenv.2018.05.181. Epub 2018 May 26.

140. Park M, et al. Air pollution influences the incidence of otitis media in children: A national population-based study. *PLoS One.* 2018 Jun 28;13(6):e0199296. doi: 10.1371/journal.pone.0199296. eCollection 2018.

141. Pasqua LA, et al. Exercising in Air Pollution: The Cleanest versus Dirtiest Cities Challenge. *Int J Environ Res Public Health.* 2018 Jul 17;15(7). pii: E1502. doi: 10.3390/ijerph15071502.

142. Guan T, et al. The effects of face masks on airway inflammation and endothelial dysfunction in healthy young adults: a double-blind, randomized, controlled crossover study. Part Fibre Toxicol. 2018 Jul 4;15(1):30. doi: 10.1186/s12989-018-0266-0.

143. Park SY, et al. Air Pollution, Autophagy, and Skin Aging: Impact of Particulate Matter (PM10) on Human Dermal Fibroblasts. *Int J Mol Sci.* 2018 Sep 12;19(9). pii: E2727. doi: 10.3390/ijms19092727.

144. Schwartz J, et al. A National Multicity Analysis of the Causal Effect of Local Pollution, [Formula: see text], and [Formula: see text] on Mortality. *Environ Health Perspect.* 2018 Aug;126(8):87004. doi: 10.1289/EHP2732.

145. Jans J, et al. Economic status, air quality, and child health: Evidence from inversion episodes. *J Health Econ.* 2018 Aug 16;61:220-232. doi: 10.1016/j.jhealeco.2018.08.002. [Epub ahead of print]

146. Kim JH, et al. Premature Deaths Attributable to Long-term Exposure to Ambient Fine Particulate Matter in the Republic of Korea. *J Korean Med Sci.* 2018 Aug 23;33(37):e251. doi: 10.3346/jkms.2018.33.e251. eCollection 2018 Sep 10.
147. Heft-Neal S, et al. Robust relationship between air quality and infant mortality in Africa. *Nature* volume 559, pages 254–258 (2018)
148. Hill EL, et al. Shale gas development and infant health: Evidence from Pennsylvania. *J Health Econ.* 2018 Aug 13;61:134–150. doi: 10.1016/j.jhealeco.2018.07.004. [Epub ahead of print]
149. Aroui H, et al. The effect of environmental factors on the incidence of perforated appendicitis. *Ann Ital Chir.* 2018 Jul 23;7. pii: S0003469X18028014. [Epub ahead of print]
150. Chen CC, et al. Effects of ambient air pollution exposure on frequency of hospital admissions for appendicitis in Taipei, Taiwan. *J Toxicol Environ Health A.* 2018 Jul 26:1–7. doi:10.1080/15287394.2018.1498276. [Epub ahead of print]
151. Wooding DJ, et al. Particle Depletion Does Not Remediate Acute Effects of Traffic-Related Air Pollution and Allergen: A Randomized, Double-Blinded Crossover Study. *Am J Respir Crit Care Med.* 2019 Apr 12. doi: 10.1164/rccm.201809-1657OC. [Epub ahead of print]
152. Billings ME, et al. The Association of Ambient Air Pollution with Sleep Apnea: The Multi-Ethnic Study of Atherosclerosis. *Ann Am Thorac Soc.* 2018 Dec 20. doi: 10.1513/AnnalsATS.201804-248OC. [Epub ahead of print]

153. Friedrich MJ. Global Impact of Air Pollution on Children's Health. *JAMA*. 2018 Dec 18;320(23):2412. doi: 10.1001/jama.2018.19559.
154. Baek K, et al. Impact of Heart Disease Risk Factors, Respiratory Illness, Mastery, and Quality of Life on the Health Status of Individuals Living Near a Major Railyard in Southern California. *Int J Environ Res Public Health*. 2018 Dec 6;15(12). pii: E2765. doi: 10.3390/ijerph15122765.
155. Yang Y, et al. Short-term and long-term exposures to fine particulate matter constituents and health: A systematic review and meta-analysis. *Environ Pollut*. 2018 Dec 21;247:874-882. doi: 10.1016/j.envpol.2018.12.060. [Epub ahead of print]
156. Lin CY, et al. The effects of exposure to air pollution on the development of uterine fibroids. *Int J Hyg Environ Health*. 2019 Feb 25. pii: S1438-4639(18)30882-4. doi: 10.1016/j.ijheh.2019.02.004. [Epub ahead of print]
157. Bowe B, et al. Estimates of the 2016 global burden of kidney disease attributable to ambient fine particulate matter air pollution. *BMJ Open*. 2019 May 9;9(5):e022450. doi: 10.1136/bmjopen-2018-022450.
158. Goyal N, et al. Early-life exposure to ambient fine particulate air pollution and infant mortality: pooled evidence from 43 low- and middle-income countries. *Int J Epidemiol*. 2019 May 10. pii: dyz090. doi: 10.1093/ije/dyz090. [Epub ahead of print]
159. De Marco A et al. Impacts of air pollution on human and ecosystem health, and implications for the National Emission

Ceilings Directive: insights from Italy. Environment International
2019 Feb 7; 125:320-33

160. Kim SY, et al. Association of Air Pollution With Increased Risk of Peritonsillar Abscess Formation. *JAMA Otolaryngol Head Neck Surg.* 2019 Apr 25. doi: 10.1001/jamaoto.2019.0742. [Epub ahead of print]
161. Hanigan IC, et al. All-cause mortality and long-term exposure to low level air pollution in the ‘45 and up study’ cohort, Sydney, Australia, 2006–2015. *Environment International.* Volume 126, May 2019, Pages 762-770
162. Wang HH, et al. Combined toxicity of outdoor air pollution on kidney function among adult women in Mianyang City, southwest China. *Chemosphere.* 2019 Aug 16;238:124603. doi: 10.1016/j.chemosphere.2019.124603. [Epub ahead of print]
163. Holme JA, et al. Potential role of polycyclic aromatic hydrocarbons as mediators of cardiovascular effects from combustion particles. *Environ Health.* 2019 Aug 22;18(1):74. doi: 10.1186/s12940-019-0514-2.
164. Chen CC, et al. Relationship between fine particulate air pollution exposure and human adult life expectancy in Taiwan. *J Toxicol Environ Health A.* 2019 Aug 22:1-7. doi: 10.1080/15287394.2019.1658386. [Epub ahead of print]
165. Shepherd A, et al. Arthritis diagnosis and early-life exposure to air pollution. *Environ Pollut.* 2019 Oct;253:1030-1037. doi: 10.1016/j.envpol.2019.07.054. Epub 2019 Jul 13.

166. Leogrande S, et al. Industrial air pollution and mortality in the Taranto area, Southern Italy: A difference-in-differences approach. *Environ Int.* 2019 Aug 6;132:105030. doi: 10.1016/j.envint.2019.105030. [Epub ahead of print]
167. Wang Y, et al. Associations of daily mortality with short-term exposure to PM_{2.5} and its constituents in Shanghai, China. *Chemosphere.* 2019 Oct;233:879-887. doi: 10.1016/j.chemosphere.2019.05.249. Epub 2019 Jun 1.
168. Yu H, et al. The Association between Air Pollution and Sleep Duration: A Cohort Study of Freshmen at a University in Beijing, China. *Int J Environ Res Public Health.* 2019 Sep 11;16(18). pii: E3362. doi: 10.3390/ijerph16183362.
169. Lee W, et al. Synergic effect between high temperature and air pollution on mortality in Northeast Asia. *Environ Res.* 2019 Sep 9;178:108735. doi: 10.1016/j.envres.2019.108735. [Epub ahead of print]
170. Holder C, et al. Evaluating Potential Human Health Risks from Modeled Inhalation Exposures to Volatile Organic Compounds Emitted from Oil and Gas Operations. *J Air Waste Manag Assoc.* 2019 Oct 17. doi: 10.1080/10962247.2019.1680459. [Epub ahead of print]
171. Deng Q, et al. Relationship between Air Pollution and Regional Longevity in Guangxi, China. *Int J Environ Res Public Health.* 2019 Oct 3;16(19). pii: E3733. doi: 10.3390/ijerph16193733.
172. Shen H, et al. Relaxing Energy Policies Coupled with Climate Change Will Significantly Undermine Efforts to Attain US

Ozone Standards. One Earth, 2019; 1 (2): 229 DOI: 10.1016/j.oneear.2019.09.006

173. Hvidtfeldt UA, et al. Long-term residential exposure to PM_{2.5} constituents and mortality in a Danish cohort. Environ Int. 2019 Oct 29;133(Pt B):105268. doi: 10.1016/j.envint.2019.105268. [Epub ahead of print]
174. Crouse DL, et al. Evaluating the Sensitivity of PM_{2.5}-Mortality Associations to the Spatial and Temporal Scale of Exposure Assessment. Epidemiology. 2019 Nov 4. 10.1097/EDE.0000000000001136.
175. Alex AM, et al. Exposure to ambient air pollution and autoantibody status in rheumatoid arthritis. Clin Rheumatol. 2019 Nov 15. doi: 10.1007/s10067-019-04813-w. [Epub ahead of print]
176. Mahase E. Study links air pollution to several new causes of hospital admissions. BMJ. 2019 Nov 28;367:I6741. doi: 10.1136/bmj.i6741.
177. Schraufnagel D, et al. Air Pollution and Noncommunicable Diseases. Chest. February 2019 Volume 155, Issue 2, Pages 409–416
178. Schraufnagel D, et al. Health Benefits of Air Pollution Reduction. Annals of the American Thoracic Society. Vol. 16, No. 12 | Dec 01, 2019
179. Michael Brauer M, et al. Mortality–Air Pollution Associations in Low-Exposure Environments (MAPLE): Phase 1. Health Effects Institute. Research Report 203, November 2019

180. Bowe B, et al. Burden of Cause-Specific Mortality Associated With PM_{2.5} Air Pollution in the United States. *JAMA Network Open*. November 20, 2019
181. Tang M, et al. The association of short-term effects of air pollution and sleep disorders among elderly residents in China. *Sci Total Environ*. 2019 Nov 19;134846. doi: 10.1016/j.scitotenv.2019.134846. [Epub ahead of print]
182. Peng K, et al. Particulate matter exposure aggravates osteoarthritis severity. *Clin Sci (Lond)*. 2019 Oct 18. pii: CS20190458. doi: 10.1042/CS20190458. [Epub ahead of print]. PMID: 31696218 [PubMed - as supplied by publisher]
183. Pope CA, et al. Fine particulate air pollution and human mortality: 25+ years of cohort studies. *Environmental Research*. Available online 14 November 2019, 108924
184. Yamamoto SS, et al. Household air pollution and arthritis in low-and middle-income countries: Cross-sectional evidence from the World Health Organization's study on Global Ageing and Adult Health. *PLoS One*. 2019 Dec 27;14(12):e0226738. doi: 10.1371/journal.pone.0226738. eCollection 2019.
185. Ranzani OT, et al. Association of Ambient and Household Air Pollution With Bone Mineral Content Among Adults in Peri-urban South India. *JAMA Netw Open*. 2020 Jan 3;3(1):e1918504. doi: 10.1001/jamanetworkopen.2019.18504.
186. Liu J, et al. Has the mortality risk declined after the improvement of air quality in an ex-heavily polluted Chinese city-Lanzhou? *Chemosphere*. 2020 Mar;242:125196. doi: 10.1016/j.chemosphere.2019.125196. Epub 2019 Oct 29.

187. Selley L, et al. Brake dust exposure exacerbates inflammation and transiently compromises phagocytosis in macrophages. *Metallomics*. DOI: 10.1039/c9mt00253g
188. Wang Z, et al. Traffic-related environmental factors and childhood obesity: A systematic review and meta-analysis. *Obes Rev*. 2020 Jan 30. doi: 10.1111/obr.12995. [Epub ahead of print]
189. Deryugina T, et al. The Mortality and Medical Costs of Air Pollution: Evidence from Changes in Wind Direction. *American Economic Review*, 2019; 109 (12): 4178 DOI: 10.1257/aer.20180279
190. Weitekamp CA, et al. A systematic review of the health effects associated with the inhalation of particle-filtered and whole diesel exhaust. *Inhal Toxicol*. 2020 Feb 26:1-13. doi: 10.1080/08958378.2020.1725187. [Epub ahead of print]
191. Fouladi F, et al. Air pollution exposure is associated with the gut microbiome as revealed by shotgun metagenomic sequencing. *Environment International*, 2020; 138: 105604 DOI: 10.1016/j.envint.2020.105604
192. Sharma A, et al. Quantification of air pollution exposure to in-pram babies and mitigation strategies. *Environment International*, 2020; 139: 105671 DOI: 10.1016/j.envint.2020.105671
193. Chen K, Wang M, Huang C, Kinney PL, Anastas PT. Air pollution reduction and mortality benefit during the COVID-19 outbreak in China [published online ahead of print, 2020 May 13]. *Lancet Planet Health*. 2020;doi:10.1016/S2542-5196(20)30107-8

194. Groves CP, et al. Intensive care admissions and outcomes associated with short-term exposure to ambient air pollution: a time series analysis. *Intensive Care Med.* 2020 Apr 30. doi: 10.1007/s00134-020-06052-z. [Epub ahead of print]
195. <https://projects.iq.harvard.edu/covid-pm>
196. Ogen Y. Assessing nitrogen dioxide (NO₂) levels as a contributing factor to coronavirus (COVID-19) fatality. *Science of The Total Environment.* Volume 726, 15 July 2020, 138605
197. Lee WJ, Liu CY, Peng LN, Lin CH, Lin HP, Chen LK. PM2.5 air pollution contributes to the burden of frailty. *Sci Rep.* 2020 Sep 2;10(1):14478. doi: 10.1038/s41598-020-71408-w.
198. Liu Q, et al. Spatiotemporal impacts of COVID-19 on air pollution in California, USA. *Sci Total Environ.* 2020 Aug 10;750:141592. doi: 10.1016/j.scitotenv.2020.141592.
199. Hyun SW, Song SJ, Park B, Lee TG, Kim CS. Toxicological effects of urban particulate matter on corneal and conjunctival epithelial cells. *Toxicol Res.* 2020 Feb 10;36(4):311-318. doi: 10.1007/s43188-019-00034-0. eCollection 2020 Oct. PMID: 33005590
200. Wu J, Pu Y. Air pollution, general government public-health expenditures and income inequality: Empirical analysis based on the spatial Durbin model. *PLoS One.* 2020 Oct 1;15(10):e0240053. doi: 10.1371/journal.pone.0240053. eCollection 2020. PMID: 33002068
201. Liu Y, Austin E, Xiang J, Gould T, Larson T, Seto E. Health Impact Assessment of PM 2.5 attributable mortality from the September 2020 Washington State Wildfire Smoke

Episode.medRxiv. 2020 Sep 22:2020.09.19.20197921. doi: 10.1101/2020.09.19.20197921. Preprint. PMID: 32995819 Free PMC article.

202. Yao J, et al. Sub-Daily Exposure to Fine Particulate Matter and Ambulance Dispatches during Wildfire Seasons: A Case-Crossover Study in British Columbia, Canada.

Environmental Health Perspectives, 2020; 128 (6): 067006 DOI: 10.1289/EHP5792

203. Wu X, et al. Evaluating the Impact of Long-term Exposure to Fine Particulate Matter on Mortality Among the Elderly.

Science Advances, 2020 DOI: 10.1126/sciadv.aba5692

204. Yang J, et al. Fine particulate matter constituents and cause-specific mortality in China: A nationwide modelling study.

Environ Int. 2020 Jun 30;143:105927. doi:

10.1016/j.envint.2020.105927. [Epub ahead of print]

205. Daellenbach, KR, et al. Sources of particulate-matter air pollution and its oxidative potential in Europe. Nature, 2020; 587 (7834): 414 DOI: 10.1038/s41586-020-2902-8

206. Conticini E, Frediani B, Caro D. Can atmospheric pollution be considered a co-factor in extremely high level of SARS-CoV-2 lethality in Northern Italy? Environ Pollut. 2020 Apr 4:114465. doi: 10.1016/j.envpol.2020.114465.

207. Lolli S, Chen YC, Wang SH, Vivone G. Impact of meteorological conditions and air pollution on COVID-19 pandemic transmission in Italy. Sci Rep. 2020 Oct 1;10(1):16213. doi: 10.1038/s41598-020-73197-8.

208. Karan A, Ali K, Teelucksingh S, Sakhamuri S. The impact of air pollution on the incidence and mortality of COVID-19. *Glob Health Res Policy*. 2020 Sep 1;5:39. doi: 10.1186/s41256-020-00167-y. eCollection 2020. PMID: 32879902 Free PMC article
209. Cazzolla Gatti R, Velichevskaya A, Tateo A, Amoroso N, Monaco A. Machine learning reveals that prolonged exposure to air pollution is associated with SARS-CoV-2 mortality and infectivity in Italy. *Environ Pollut*. 2020 Aug 21;267:115471. doi: 10.1016/j.envpol.2020.115471. PMID: 32882464
210. Chen K, et al. Ambient carbon monoxide and daily mortality: a global time-series study in 337 cities. *The Lancet Planetary Health*, 2021; 5 (4): e191 DOI: 10.1016/S2542-5196(21)00026-7
211. Meng X, et al. Short term associations of ambient nitrogen dioxide with daily total, cardiovascular, and respiratory mortality: multilocation analysis in 398 cities. *BMJ* 2021; 372 doi: <https://doi.org/10.1136/bmj.n534> (Published 24 March 2021)
212. Yazdi MD, et al. Long-Term Association of Air Pollution and Hospital Admissions Among Medicare Participants Using a Doubly Robust Additive Model. *Circulation*, 2021; DOI: 10.1161/CIRCULATIONAHA.120.050252
213. Zheng H, Yi W, Ding Z, Xu Z, Ho HC, Cheng J, Hossain MZ, Song J, Fan Y, Ni J, Wang Q, Xu Y, Wei J, Su H. Evaluation of life expectancy loss associated with submicron and fine particulate matter (PM₁ and PM_{2.5}) air pollution in Nanjing, China. *Environ Sci Pollut Res Int*. 2021 Jul 15. doi: 10.1007/s11356-021-15244-z. Epub ahead of print. PMID: 34268691.

214. Adami G, Cattani G, Rossini M, Viapiana O, Olivi P, Orsolini G, Bertoldo E, Fracassi E, Gatti D, Fassio A. Association between exposure to fine particulate matter and osteoporosis: a population-based cohort study. *Osteoporos Int.* 2021 Jul 15. doi: 10.1007/s00198-021-06060-9. Epub ahead of print. PMID: 34268604.
215. Xiaodan Zhou, Kevin Josey, Leila Kamareddine, Miah C. Caine, Tianjia Liu, Loretta J. Mickley, Matthew Cooper, Francesca Dominici. Excess of COVID-19 cases and deaths due to fine particulate matter exposure during the 2020 wildfires in the United States. *Science Advances*, 2021; 7 (33): eabi8789 DOI: 10.1126/sciadv.abi8789
216. Bozack A, et al. Long-Term Air Pollution Exposure and COVID-19 Mortality: A Patient-Level Analysis from New York City. *American Journal of Respiratory and Critical Care Medicine*, 2021; DOI: 10.1164/rccm.202104-0845OC
217. Kogevinas M, et al. Ambient Air Pollution in Relation to SARS-CoV-2 Infection, Antibody Response, and COVID-19 Disease: A Cohort Study in Catalonia, Spain (COVICAT Study). *Environmental Health Perspectives*, 2021; 129 (11) DOI: 10.1289/EHP9726
218. Adami G, Pontalti M, Cattani G, et al Association between long-term exposure to air pollution and immune-mediated diseases: a population-based cohort study *RMD Open* 2022;8:e002055. doi: 10.1136/rmdopen-2021-002055
219. Petracca B, Nădăban A, Eeman M, Gooris GS, Bouwstra JA. Effects of ozone on stratum corneum lipid integrity and assembly. *Chem Phys Lipids*. 2021 Aug 2:105121. doi:

10.1016/j.chemphyslip.2021.105121. Epub ahead of print. PMID: 34352254.

220. Hyun SW, Song SJ, Park B, Lee TG, Kim CS. Toxicological effects of urban particulate matter on corneal and conjunctival epithelial cells. *Toxicol Res*. 2020 Feb 10;36(4):311-318. doi: 10.1007/s43188-019-00034-0. eCollection 2020 Oct. PMID: 33005590

221. Lolli S, Chen YC, Wang SH, Vivone G. Impact of meteorological conditions and air pollution on COVID-19 pandemic transmission in Italy. *Sci Rep*. 2020 Oct 1;10(1):16213. doi: 10.1038/s41598-020-73197-8. PMID: 33004925

222. Wu J, Pu Y. Air pollution, general government public-health expenditures and income inequality: Empirical analysis based on the spatial Durbin model. *PLoS One*. 2020 Oct 1;15(10):e0240053. doi: 10.1371/journal.pone.0240053. eCollection 2020. PMID: 33002068 Free PMC article.

223. Liu Y, Austin E, Xiang J, Gould T, Larson T, Seto E. Health Impact Assessment of PM 2.5 attributable mortality from the September 2020 Washington State Wildfire Smoke Episode. *medRxiv*. 2020 Sep 22:2020.09.19.20197921. doi: 10.1101/2020.09.19.20197921

224. Kumar S, Sharma A, Thaker R. Air pollutants and impairments of male reproductive health-an overview. *Rev Environ Health*. 2021 Jan 29. doi: 10.1515/reveh-2020-0136. Online ahead of print

225. Moradi M, Hadei M, Yazdani M, Goudarzi M, Baboli Z, Tahmasebi Birgani Y, Neisi A, Goudarzi G. Effect of long-term exposure to PM2.5 on years of life lost in a populated Middle

Eastern city. Environ Geochem Health. 2021 Feb 5. doi: 10.1007/s10653-021-00827-z

226. Bora K. Air Pollution as a Determinant of Undernutrition Prevalence among Under-Five Children in India: An Exploratory Study. J Trop Pediatr. 2021 Oct 6;67(5):fmab089. doi: 10.1093/tropej/fmab089

227. Ding S, Sun S, Ding R, Song S, Cao Y, Zhang L. Association between exposure to air pollutants and the risk of inflammatory bowel diseases visits. Environ Sci Pollut Res Int. 2021 Oct 20. doi: 10.1007/s11356-021-17009-0

228. Offer S, et al. Effect of Atmospheric Aging on Soot Particle Toxicity in Lung Cell Models at the Air-Liquid Interface: Differential Toxicological Impacts of Biogenic and Anthropogenic Secondary Organic Aerosols (SOAs). Environ Health Perspect. 2022 Feb;130(2):27003. doi: 10.1289/EHP9413. Epub 2022 Feb 3. PMID: 35112925

229. Xie S, Zhang C, Zhao J, Li D, Chen J. Exposure to concentrated ambient PM_{2.5} (CAPM) induces intestinal disturbance via inflammation and alternation of gut microbiome. Environ Int. 2022 Feb 14;161:107138. doi: 10.1016/j.envint.2022.107138

230. Zhao Y, Zhu Q, Lin J, Cai J. Association of Exposure to Particulate Matter Air Pollution With Semen Quality Among Men in China. JAMA Netw Open. 2022 Feb 1;5(2):e2148684. doi: 10.1001/jamanetworkopen.2021.48684. PMID: 35175344

231. Heo S, Kim H, Kim S, Choe SA, Byun G, Lee JT, Bell ML. Associations between Long-Term Air Pollution Exposure and Risk of Osteoporosis-Related Fracture in a Nationwide Cohort Study

in South Korea. *Int J Environ Res Public Health.* 2022 Feb 19;19(4):2404. doi: 10.3390/ijerph19042404. PMID: 3520659

232. Keulers L, et al. Probiotics, prebiotics, and synbiotics to prevent or combat air pollution consequences: The gut-lung axis. *Environ Pollut.* 2022 Feb 28:119066. doi: 10.1016/j.envpol.2022.119066. Online ahead of print. PMID: 35240267 Review

233. Antuña E, Carlos Bermejo-Millo J, Caso-Onzain E, Caso-Peláez E, Potes Y, Coto-Montes A. Removal of Environmental Nanoparticles Increases Protein Synthesis and Energy Production in Healthy Humans. *Front Bioeng Biotechnol.* 2022 Feb 14;10:800011. doi: 10.3389/fbioe.2022.800011. eCollection 2022

234. Favarato, G., Clemens, T., Cunningham, S., Dibben, C., Macfarlane, A., Milojevic, A., et al. (2021). Air Pollution, Housing and Respiratory Tract Infections in Children: National Birth Cohort Study (PICNIC): Study Protocol. *BMJ Open* 11, e048038. doi:10.1136/bmjopen-2020-048038

235. Lavigne E, Rytí N, Gasparrini A, Sera F, Weichenthal S, Chen H, To T, Evans GJ, Sun L, Dheri A, Lemogo L, Kotchi SO, Stieb D. Short-term exposure to ambient air pollution and individual emergency department visits for COVID-19: a case-crossover study in Canada. *Thorax.* 2022 Mar 31:thoraxjnl-2021-217602. doi: 10.1136/thoraxjnl-2021-217602

236. Razzaq A, Cui Y, Irfan M, Maneengam A, Acevedo-Duque Á. Asymmetric effects of fine particulate matter and stringency policy on COVID-19 intensity. *Int J Environ Health Res.* 2022 Mar 31:1-13. doi: 10.1080/09603123.2022.2059452

237. Chang KH, Teng CJ, Hsu YC, Tsai SC, Lin HJ, Hsieh TL, Muo CH, Hsu CY, Chou RH. Long-Term Exposure to Air Pollution Associates the Risk of Benign Brain Tumor: A Nationwide, Population-Based, Cohort Study in Taiwan. *Toxics*. 2022 Apr 2;10(4):176. doi: 10.3390/toxics10040176. PMID: 35448437

238. Calderón-Garcidueñas L, González-Maciel A, Reynoso-Robles R, Silva-Pereyra HG, Torres-Jardón R, Brito-Aguilar R, Ayala A, Stommel EW, Delgado-Chávez R. Environmentally Toxic Solid Nanoparticles in Noradrenergic and Dopaminergic Nuclei and Cerebellum of Metropolitan Mexico City Children and Young Adults with Neural Quadruple Misfolded Protein Pathologies and High Exposures to Nano Particulate Matter. *Toxics*. 2022 Mar 29;10(4):164. doi: 10.3390/toxics10040164. PMID: 35448425

239. Eckhardt CM, Baccarelli AA, Wu H. Environmental Exposures and Extracellular Vesicles: Indicators of Systemic Effects and Human Disease. *Curr Environ Health Rep.* 2022 Apr 21. doi: 10.1007/s40572-022-00357-5. Epub ahead of print. PMID: 35449498.

