

SOURCES OF EVIDENCE AND THEIR WEIGHT				Relevance	Validity	Reliability	WoE Score	WoE Contribution
Exposure								
Aerts, S., Calderon, C., Valič, B., Maslanyj, M., Addison, D., Mee, T., Goiceanu, C., Verloock, L., Van den Bossche, M., Gajšek, P., Vermeulen, R., Röösl, M., Cardis, E., Martens, L., & Joseph, W.	2017 Measurements of intermediate-frequency electric and magnetic fields in households.	https://doi.org/10.1016/j.envres.2017.01.001		High	High	High	9	High
Kitajima, T., Schüz, J., Morita, A., Ikeda, W., Tanaka, H., Togawa, K., Gabazza, E. C., Taki, M., Toriyabe, K., Ikeda, T., & Sokejima, S.	2022 Measurement of Intermediate Frequency Magnetic Fields Generated by Household In	https://doi.org/10.3390/ijerph191911912		High	High	Medium	8	High
Gajšek, P., Ravazzani, P., Grellier, J., Samaras, T., Bakos, J., & Thuróczy, G.	2016 Review of Studies Concerning Electromagnetic Field (EMF) Exposure Assessment in Eu	https://doi.org/10.3390/ijerph13090875		High	High	Medium	8	High
Bonato, M., Chiaramello, E., Parazzini, M., Gajšek, P., & Ravazzani, P.	2023 Extremely Low Frequency Electric and Magnetic Fields Exposure: Survey of Recent Find	https://doi.org/10.1109/JERM.2023.3268555		High	High	High	9	High
Interaction mechanisms								
Bouché, N. F., & McConway, K.	2019 Melatonin Levels and Low-Frequency Magnetic Fields in Humans and Rats: New Insight	https://doi.org/10.1002/bem.22218		High	High	High	9	High
Ohayon, M. M., Stolt, V., Freund, F. T., Milesi, C., & Sullivan, S. S.	2019 The potential for impact of man-made super low and extremely low frequency electro	https://doi.org/10.1016/j.smr.2019.06.001		Medium	Medium	Medium	6	Medium
Bertagna, F., Lewis, R., Silva, S. R. P., McFadden, J., & Jeevaratnam, K.	2021 Effects of electromagnetic fields on neuronal ion channels: a systematic review. Annals	https://doi.org/10.1111/nyas.14597		High	High	High	9	High
Golbach, L. A., Portelli, L. A., Savelkoul, H. F., Terwel, S. R., Kuster, N., de Vries, R. B., & Verburg-van Kemenade, B. M.	2016 Calcium homeostasis and low-frequency magnetic and electric field exposure: A system	https://doi.org/10.1016/j.envint.2016.01.014		High	High	High	9	High
Panagopoulos, D. J., Karabarbounis, A., Yakymenko, I., & Chrousos, G. P.	2021 Human made electromagnetic fields: Ion forced oscillation and voltage gated ion chan	https://doi.org/10.3892/ijo.2021.5272		Low	Medium	Medium	5	Medium
Juutilainen, J., Herrala, M., Luukkainen, J., Naarala, J., & Hore, P. J.	2018 Magnetocarcinogenesis: is there a mechanism for carcinogenic effects of weak magne	https://doi.org/10.1098/rspb.2018.0590		High	Medium	Medium	7	High
Giorgi, G., & Del Re, B.	2021 Epigenetic dysregulation in various types of cells exposed to extremely low-frequency	https://doi.org/10.1007/s00441-021-03489-6		High	Medium	Medium	7	High
Schuermann, D., & Mevissen, M.	2021 Manmade Electromagnetic Fields and Oxidative Stress-Biological Effects and Conseque	https://doi.org/10.3390/ijms22073772		High	Medium	Medium	7	High
Mansourian, M., Marateb, H. R., & Vaseghi, G.	2016 The effect of extremely low-frequency magnetic field (50-60 Hz) exposure on spontane	https://doi.org/10.4103/2277-9175.187375		High	Low	Low	5	Medium
Health effects from ELF EMF								
Schüz, J., & Erdmann, F.	2016 Environmental Exposure and Risk of Childhood Leukemia: An Overview. Archives of me	https://doi.org/10.1016/j.arcmed.2016.11.017		Medium	Low	Medium	5	Medium
Kheifets, L., Swanson, J., Yuan, Y., Kusters, C., & Vergara, X.	2017 Comparative analyses of studies of childhood leukemia and magnetic fields, radon and	https://doi.org/10.1088/1361-6498/aa5fc7		High	Medium	High	8	High
Onyije, F. M., Olsson, A., Baaken, D., Erdmann, F., Stanulla, M., Wollschläger, D., & Schüz, J.	2022 Environmental Risk Factors for Childhood Acute Lymphoblastic Leukemia: An Umbrella	https://doi.org/10.3390/cancers14020382		High	High	Medium	8	High
Swanson, J., Kheifets, L., & Vergara, X.	2019 Changes over time in the reported risk for childhood leukaemia and magnetic fields. Jc	https://doi.org/10.1088/1361-6498/ab0586		High	High	High	9	High
Seomun, G., Lee, J., & Park, J.	2021 Exposure to extremely low-frequency magnetic fields and childhood cancer: A systema	https://doi.org/10.1371/journal.pone.0251628		High	High	High	9	High
Brabant, C., Geerinck, A., Beaudart, C., Tirelli, E., Geuzaine, C., & Bruyère, O.	2022 Exposure to magnetic fields and childhood leukemia: a systematic review and meta-an	https://doi.org/10.1515/revch-2021-0112		High	High	High	9	High
Amoon, A. T., Swanson, J., Magnani, C., Johansen, C., & Kheifets, L.	2022 Pooled analysis of recent studies of magnetic fields and childhood leukemia. Environm	https://doi.org/10.1016/j.envres.2021.111993		High	High	High	9	High
Health Council of the Netherlands.	2018 Power lines and health part I: childhood cancer. The Hague: Health Council of the Netherlands, 2018; publication no. 2018/08e.			High	High	High	9	High
Health Council of the Netherlands.	2022 Power lines and health: cancer in adults. The Hague: Health Council of the Netherlands, 2022; publication no. 2022/14e.			High	High	High	9	High
Killin, L. O., Starr, J. M., Shiue, I. J., & Russ, T. C.	2016 Environmental risk factors for dementia: a systematic review. BMC geriatrics, 16(1), 17	https://doi.org/10.1186/s12877-016-0342-y		High	Medium	Medium	7	High
Gunnarsson, L. G., & Bodin, L.	2017 Parkinson's disease and occupational exposures: a systematic literature review and me	https://doi.org/10.5271/sjweh.3641		High	Medium	Medium	7	High
Gunnarsson, L. G., & Bodin, L.	2019 Occupational Exposures and Neurodegenerative Diseases-A Systematic Literature Revi	https://doi.org/10.3390/ijerph16030337		High	High	High	9	High
Huss, A., Peters, S., & Vermeulen, R.	2018 Occupational exposure to extremely low-frequency magnetic fields and the risk of ALS	https://doi.org/10.1002/bem.22104		High	High	High	9	High
Röösl, M., & Jalilian, H.	2018 A meta-analysis on residential exposure to magnetic fields and the risk of amyotrophic	https://doi.org/10.1515/revch-2018-0019		High	High	High	9	High
Jalilian, H., Teshnizi, S. H., Röösl, M., & Neghab, M.	2018 Occupational exposure to extremely low frequency magnetic fields and risk of Alzheim	https://doi.org/10.1016/j.neuro.2017.12.005		High	High	High	9	High
Habash, M., Gogna, P., Krewski, D., & Habash, R. W. Y.	2019 Scoping Review of the Potential Health Effects of Exposure to Extremely Low-Frequen	https://doi.org/10.1615/CritRevBiomedEng.2019030211		High	High	High	9	High
Health Council of the Netherlands.	2022 Power lines and health: neurodegenerative diseases. The Hague: Health Council of the Netherlands, 2022; publication no. 2022/13e.			High	High	High	9	High
Ohayon, M. M., Stolt, V., Freund, F. T., Milesi, C., & Sullivan, S. S.	2019 The potential for impact of man-made super low and extremely low frequency electro	https://doi.org/10.1016/j.smr.2019.06.001		High	High	High	9	High
Woods, N., Gilliland, J., & Seabrook, J. A.	2017 The influence of the built environment on adverse birth outcomes. Journal of neonata	https://doi.org/10.3233/NPM-16112		High	High	High	9	High

Zhou F., Ma C., Li Y., Zhang M., & Liu W. 2022 The Effect of Extremely Low-Frequency Electromagnetic Radiation on Pregnancy Outcome. *Annals of the New York Academy of Sciences*. <https://www.anncaserep.com/abstract.php?aid=9338>

Ramezanifar, S., Beyrami, S., Mehrifar, Y., Ramezanifar, E., Soltanpour, Z., Namdari, M., & Gharari, N. 2023 Occupational Exposure to Physical and Chemical Risk Factors: A Systematic Review of the Literature. *Journal of Environmental and Public Health*. <https://doi.org/10.1016/j.shaw.2022.10.005>

Leszczynski D. 2021 Review of the scientific evidence on the individual sensitivity to electromagnetic fields. *Journal of Environmental and Public Health*. <https://doi.org/10.1515/reveh-2021-0038>

Bouché, N. F., & McConway, K. 2019 Melatonin Levels and Low-Frequency Magnetic Fields in Humans and Rats: New Insights. *Journal of Environmental and Public Health*. <https://doi.org/10.1002/bem.22218>

High	High	High	9	High
High	High	High	9	High
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High	High	High	9	High

Health effects from IF EMF

Bodewein, L., Schmiedchen, K., Dechent, D., Stunder, D., Graefrath, D., Winter, L., Kraus, T., & Driessen, S. 2019 Systematic review on the biological effects of electric, magnetic and electromagnetic fields. *Environmental Health Perspectives*. <https://doi.org/10.1016/j.envres.2019.01.015>

Lee, H. J., Jin, H., Ahn, Y. H., Kim, N., Park, J. K., Choi, H. D., & Lee, Y. S. 2022 Effects of intermediate frequency electromagnetic fields: a review of animal studies. *Journal of Environmental and Public Health*. Advance online publication.

High	High	High	9	High
High	High	medium	8	High

AUXILIARY PUBLICATIONS USED TO WEIGH THE SOURCES OF EVIDENCE & INFORMATIVE PUBLICATIONS

Exposure

Mahesh, A., Chokkalingam, B., & Mihet-Popa, L. 2021 Inductive Wireless Power Transfer Charging for Electric Vehicles – A Review. *IEEE Access*. <https://doi.org/10.1109/ACCESS.2021.3116678>

Miwa, K., Takenaka, T., & Hirata, A. 2019 Electromagnetic Dosimetry and Compliance for Wireless Power Transfer Systems in Vehicle-to-Infrastructure Systems. *IEEE Transactions on Electromagnetic Compatibility*. <https://doi.org/10.1109/TEMC.2019.2949983>

Hausmann, N., Zang, M., Mease, R., Schmuelling, B., & Clemens, M. 2022 Magnetic dosimetry simulations of wireless power transfer systems with high resolution. *Journal of Environmental and Public Health*. <https://doi.org/10.1002/jnm.3075>

Liorni, I., Bottauscio, O., Guilizzoni, R., Ankarson, P., Bruna, J., Fallahi, A., Harmon, S., & Zucca, M. 2020 Assessment of Exposure to Electric Vehicle Inductive Power Transfer Systems: Experimental and Numerical Studies. *IEEE Transactions on Electromagnetic Compatibility*. <https://doi.org/10.3390/su12114573>

Bae, H., & Park, S. 2023 Assessment of the Electromagnetic Radiation Exposure at EV Charging Facilities. *Sensors*. <https://doi.org/10.3390/s23010162>

Mlýnek P, Ruz M, Beneš L, Sláček J, Musil P. 2021 Possibilities of Broadband Power Line Communications for Smart Home and Smart Building. *Journal of Environmental and Public Health*. <https://doi.org/10.3390/s21010240>

Monadizadeh, S., Kibert, C. J., Li, J., Woo, J., Asutosh, A., Roostaie, S., & Kouhirostami, M. 2021 A review of protocols and guidelines addressing the exposure of occupants to electromagnetic fields in smart buildings. *Journal of Environmental and Public Health*. <https://doi.org/10.3992/jgb.16.2.55>

Frankel, J., Wilén, J., & Hansson Mild, K. 2018 Assessing Exposures to Magnetic Resonance Imaging's Complex Mixture of Magnetic Fields. *Journal of Environmental and Public Health*. <https://doi.org/10.3389/fpubh.2018.00066>

Interaction mechanisms

Reilly J. 1998 Applied bioelectricity: from electrical stimulation to electropathology. New York: Springer-Verlag; 1998.

Budinger, T. F., Fischer, H., Hentschel, D., Reinfelder, H. E., & Schmitt, F. 1991 Physiological effects of fast oscillating magnetic field gradients. *Journal of computer assisted tomography*. <https://doi.org/10.1097/00004728-199111000-00001>

Cohen, M. S., Weiskoff, R. M., Rzedzian, R. R., & Kantor, H. L. 1990 Sensory stimulation by time-varying magnetic fields. *Magnetic resonance in medicine*. <https://doi.org/10.1002/mrm.1910140226>

So, P. P., Stuchly, M. A., & Nyenhuis, J. A. 2004 Peripheral nerve stimulation by gradient switching fields in magnetic resonance imaging. *IEEE Transactions on Electromagnetic Compatibility*. <https://doi.org/10.1109/TEMC.2004.834251>

Laakso, I., & Hirata, A. 2012 Computational analysis of thresholds for magnetophosphenes. *Physics in medicine and biology*. <https://doi.org/10.1088/0031-9155/57/19/6147>

Amidi, A., & Wu, L. M. 2022 Circadian disruption and cancer- and treatment-related symptoms. *Frontiers in oncology*. <https://doi.org/10.3389/fonc.2022.1009064>

Touitou, Y., & Selmaoui, B. 2012 The effects of extremely low-frequency magnetic fields on melatonin and cortisol, two pineal gland hormones. *Journal of Environmental and Public Health*. <https://doi.org/10.31887/DCNS.2012.14.4/ytouitou>

Halgamuge M. N. 2013 Pineal melatonin level disruption in humans due to electromagnetic fields and ICNIRP guidelines. *Journal of Environmental and Public Health*. <https://doi.org/10.1093/rpd/ncs255>

Maeda, K., Robinson, A. J., Henbest, K. B., Hogben, H. J., Biskup, T., Ahmad, M., Schleicher, E., Weber, S., Timmel, C. R., & Hore, P. J. 2012 Magnetically sensitive light-induced reactions in cryptochrome are consistent with its proposed mechanism of action. *PNAS*. <https://doi.org/10.1073/pnas.1118959109>

Ball, L. J., Palesh, O., & Kriegsfeld, L. J. 2016 The Pathophysiologic Role of Disrupted Circadian and Neuroendocrine Rhythms in Breast Cancer. *Endocrine reviews*. <https://doi.org/10.1210/er.2015-1133>

Wang, H., & Zhang, X. 2017 Magnetic Fields and Reactive Oxygen Species. *International journal of molecular sciences*. <https://doi.org/10.3390/ijms18102175>

Lai H. 2019 Exposure to Static and Extremely-Low Frequency Electromagnetic Fields and Cellular Effects. *Journal of Environmental and Public Health*. <https://doi.org/10.1080/15368378.2019.1656645>

Finkel T. 2011 Signal transduction by reactive oxygen species. *The Journal of cell biology*, 194(1), 7–11. <https://doi.org/10.1083/jcb.201102095>

Afanas'ev I. 2015 Mechanisms of superoxide signalling in epigenetic processes: relation to aging and cancer. *Journal of Environmental and Public Health*. <https://doi.org/10.14336/AD.2014.0924>

Consales, C., Merla, C., Marino, C., & Benassi, B. 2018 The epigenetic component of the brain response to electromagnetic stimulation in Parkinson's disease. *Journal of Environmental and Public Health*. <https://doi.org/10.1002/bem.22083>

Puri B. K. 2020 Calcium Signaling and Gene Expression. *Advances in experimental medicine and biology*. https://doi.org/10.1007/978-3-030-12457-1_22

Health effects from ELF EMF

Soffritti, M., Tibaldi, E., Padovani, M., Hoel, D. G., Giuliani, L., Bua, L., Lauriola, M., Falcioni, L., Manservigi, M., Manservigi, F., Panzacchi, S., & Belpoggi, F. 2016 Life-span exposure to sinusoidal-50 Hz magnetic field and acute low-dose gamma radiation in mice. *Journal of Environmental and Public Health*. <https://doi.org/10.3109/09553002.2016.1144942>

Soffritti, M., Tibaldi, E., Padovani, M., Hoel, D. G., Giuliani, L., Bua, L., Lauriola, M., Falcioni, L., Manservigi, M., Manservigi, F., & Belpoggi, F. 2016 Synergism between sinusoidal-50 Hz magnetic field and formaldehyde in triggering cancer in mice. *Journal of Environmental and Public Health*. <https://doi.org/10.1002/ajim.22598>

Bua, L., Tibaldi, E., Falcioni, L., Lauriola, M., De Angelis, L., Gnudi, F., Manservigi, M., Manservigi, F., Manzoli, I., Menghetti, I., Montella, R., Panzacchi, S., Sgargi, D., Strollo, V., Vornoli, A., Mandrioli, D., & Belpoggi, F.	2018 Results of lifespan exposure to continuous and intermittent extremely low frequency electromagnetic fields in mice. <i>Environmental Health Perspectives</i> , 126(2), 173–181. https://doi.org/10.1016/j.envres.2018.02.036
Wyszowska, J., & Pritchard, C.	2022 Open Questions on the Electromagnetic Field Contribution to the Risk of Neurodegeneration. <i>Journal of Electromagnetic Fields and Health</i> , 2022. https://doi.org/10.3390/ijerph192316150
Klimek, A., & Rogalska, J.	2021 Extremely Low-Frequency Magnetic Field as a Stress Factor-Really Detrimental? Insights from Animal Models. <i>Brain Sciences</i> , 11(10), 174. https://doi.org/10.3390/brainsci11020174
Modolo, J., Denoyer, Y., Wendling, F., & Benquet, P.	2018 Physiological effects of low-magnitude electric fields on brain activity: advances from animal models. <i>Current Bioinformatics</i> , 13(1), 1–11. https://doi.org/10.1016/j.cobme.2018.09.006
Ghazanfarpour, M., Kashani, Z. A., Pakzad, R., Abdi, F., Rahnemaei, F. A., Akbari, P. A., & Roozbeh, N.	2021 Effect of electromagnetic field on abortion: A systematic review and meta-analysis. <i>Open Access Journal of Health</i> , 1(1), 1–11. https://doi.org/10.1515/med-2021-0384
Darbandi, M., Darbandi, S., Agarwal, A., Henkle, R., & Sadeghi, M. R.	2018 The Effects of Exposure to Low Frequency Electromagnetic Fields on Male Fertility. <i>Alternative therapies in health and medicine</i> , 24(4), 24–29.
Suri, S., Dehghan, S. F., Sahlabadi, A. S., Ardakani, S. K., Moradi, N., Rahmati, M., & Tehrani, F. R.	2020 Relationship between exposure to Extremely Low-Frequency (ELF) magnetic field and sperm parameters. <i>Environmental Health Perspectives</i> , 128(12), 127001. https://doi.org/10.1002/1348-9585.12173
Piszczyk, P., Wójcik-Piotrowicz, K., Gil, K., & Kaszuba-Zwoińska, J.	2021 Immunity and electromagnetic fields. <i>Environmental research</i> , 200, 111505. https://doi.org/10.1016/j.envres.2021.111505
Rosado, M. M., Simkó, M., Mattsson, M. O., & Pioli, C.	2018 Immune-Modulating Perspectives for Low Frequency Electromagnetic Fields in Innate Immunity. <i>Frontiers in Immunology</i> , 9, 2585. https://doi.org/10.3389/fpubh.2018.00085
Alkayyali, T., Ochuba, O., Srivastava, K., Sandhu, J. K., Joseph, C., Ruo, S. W., Jain, A., Waqar, A., & Poudel, S.	2021 An Exploration of the Effects of Radiofrequency Radiation Emitted by Mobile Phones and Smart TVs on the Immune System. <i>Cureus</i> , 13(12), e17329. https://doi.org/10.7759/cureus.17329
Tang, L. S., Fan, Z. X., Tian, X. F., He, S. M., Ji, C., Chen, A. Q., & Ren, D. L.	2022 The influences and regulatory mechanisms of magnetic fields on circadian rhythms. <i>Chin J Physiol</i> , 55(1), 1–11. https://doi.org/10.1080/07420528.2022.2105231