



OVERVIEW

for a clearer picture

No. 2

Is mobile phone radiation carcinogenic?

Overview No. 2

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Updated: 16 September 2026

Summary

The diagnose:funk publication series "Overview for a clearer picture" reports on the state of research into the health effects of non-ionising radiation from mobile communications. Its research into scientific studies draws on the databases www.EMFdata.org and www.EMF-Portal.de.

In Overview No. 2, diagnose:funk documents the research on the risk of cancer from mobile phone radiation. For around 25 years, this has been the subject of fierce debate among scientists, authorities, mobile network operators and citizens' initiatives. Between 2016 and 2020, large-scale, high-quality studies were conducted, confirming that the WHO's 2011 classification of non-ionising radiation as "possibly carcinogenic (2B)" was not only justified, but that these new findings require classification as "probably carcinogenic (2A)" or even "carcinogenic (1)". The debate over cancer statistics is also analysed.

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1 Research findings and their assessment

The debate over whether mobile phone radiation is carcinogenic continues. In 2011, the WHO classified the radiation as "possibly carcinogenic". Research has advanced enormously since then. The debate centres particularly on the NTP study (USA)¹ and the Ramazzini study (Italy),² whose authors argue that the potential to cause cancer has been demonstrated. Laboratory investigations (in vivo, in vitro) since 2011 have provided new evidence of cancer-causing and cancer-promoting effects, as have epidemiological studies. Results obtained in vivo and in vitro are generally transferable to humans.³ The long latency period of cancer created uncertainties. Increased incidence in humans is now documented by statistics on different cancer types, which are identical to those in cell and animal investigations. Consequently, scientists are calling for mobile phone radiation to be moved from its current "possibly carcinogenic" classification to a higher category. Since then, the debate has taken place on two levels:

1. Are the available findings from cell and animal studies applicable to humans?
2. If the findings from cell and animal studies are correct, they should be reflected in cancer incidence in humans.

The following sections first document research on the cancer-causing potential of non-ionising radiation, then present statistical analyses of human incidence showing correlations. The indications of cancer-causing potential from international research are so strong that, at a minimum, a precautionary policy with information on risks and guidelines for use is required. Applying the Bradford Hill criteria, the conditions for measures to prevent harm are met.

A recent study by Melnick and Moskowitz (2026) reveals that current mobile communications exposure limits are based on incomplete animal behavioural studies from the 1980s and that important study findings are excluded from risk assessment. As a result, the actual cancer risk to the general population is drastically underestimated. The authors therefore strongly call for an independent, fundamental

1 National Toxicology Program (2018): Toxicology and Carcinogenesis Studies in Hsd:Sprague Dawley SD Rats Exposed to Whole-Body Radio Frequency Radiation at a Frequency (900 MHz) and Modulations (GSM and CDMA) Used by Cell Phones. US. https://ntp.niehs.nih.gov/ntp/htdocs/lt_rpts/tr595_508.pdf <https://www.emfdata.org/de/studien/detail?id=440>

2 Falcioni et al. (2018): Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission, Environ Res 2018; 165: 496-503; <https://www.emfdata.org/de/studien/detail?id=441>

3 Fiora Belpoggi (Ramazzini Institute): "What proved carcinogenic in animal studies always subsequently proved carcinogenic to humans too. It is becoming apparent that this also applies to mobile phone radiation." (in: Oekoskop 2-2020, p. 17, <https://www.aefu.ch/oekoskop/vorsorge-worauf-warten-wir>)

reassessment of all guidance levels, based on the scientific evidence of the past 30 years and using modern risk assessment methods that protect health.⁴

1.1 Statements on cancer studies in the German Bundestag's 2023 technology assessment report

The two most important studies of the carcinogenic effects of mobile phone radiation - the large-scale NTP study (2018) by the US health agency NIEHS and the Ramazzini Institute investigation (2018) - reach consistent findings: certain tumour types, particularly cardiac schwannomas, occurred significantly more often under mobile phone radiation exposure.

The Bundestag's technology assessment report (TAB)⁵ rates the relevance of the NTP and Ramazzini findings highly:

"Furthermore, two recent studies conducted with very large numbers of laboratory animals (rats and mice) and to a high scientific standard showed that exposure to RF-EMF signals of the kind used by mobile phones (GSM and UMTS) led to higher incidences of certain tumours or their precursors. Overall, these findings are among the most important of recent years. Since these are replicated indications of effects, they should be intensively investigated through further high-quality research. After all, they represent a significant aspect of risk assessment for humans" (p. 117).

In November 2018, BERENIS, the Swiss government's expert group on electromagnetic fields and non-ionising radiation, presented an analysis of the NTP and Ramazzini studies. Its conclusion states: "In summary, based on the findings and their assessment, BERENIS supports **the precautionary principle** in regulating RF-EMF."⁶

Studies commissioned by the Federal Office for Radiation Protection found a cancer-promoting effect, documented by the TAB:

"More recent animal studies now show increased incidences. The DMF study by Lerchl et al. (Lerchl et al. 2015; Lerchl 2018) confirmed findings from an earlier study (Tillmann et al. 2010). Mice treated with a carcinogenic substance (in this case

4 Melnick RL, Moskowitz JM (2026). Exposure limits to radiofrequency EMF do not account for cancer risk or reproductive toxicity assessed from data in experimental animals. *Environmental Health*, 25(1), 42. <https://doi.org/10.1186/s12940-026-01288-6>

5 Report of the Committee on Education, Research and Technology Assessment, parliamentary paper 20/5646 (2023): "Possible health effects of different frequency ranges of electromagnetic fields (RF-EMF)." PDF link: <https://dserver.bundestag.de/btd/20/056/2005646.pdf>

Article series analysing the report: diagnose-funk.org/1954

6 BERENIS - Swiss expert group on electromagnetic fields and non-ionising radiation, special newsletter issue, November 2018, <https://tinyurl.com/y33m3fxn>; see also: <https://diagnose-funk.org/1359>

ethylnitrosourea) show more liver and lung tumours and higher rates of lymphoma when exposed to RF-EMF." (p. 117)⁷

1.2 Overall assessment by Prof. James C. Lin: "Carcinogenesis from chronic exposure to radio-frequency radiation"⁸

1.2.1 Key statements on NTP

"The study was the largest investigation of animal health effects ever conducted by NTP/NIEHS in its history, including a large number of toxic chemicals. Among other findings, the results showed statistically significant and clear evidence (compared with concurrent controls) that exposure to mobile phone RF radiation caused the observation of malignant cardiac schwannoma (a rare tumour type) in male rats whose RF-induced body temperature rose by up to 1°C."

1.2.2 Key statements on NTP and Ramazzini

"It is noteworthy that the NTP/NIEHS and Ramazzini research on RF exposure showed comparable findings on cardiac schwannomas and cerebral gliomas. Thus, two relatively well-conducted animal experiments using the same strain of rat produced consistent findings of a significantly increased cancer risk."

1.2.3 Conclusion on upgrading "possibly ..." to "probably carcinogenic"

"The fact is that the missing pieces identified by IARC (4), or the experimental animal data previously anticipated (7), now provided by NTP/NIEHS (10) and the Ramazzini Institute (12), complement IARC's assessment of human epidemiological studies supporting its classification of RF radiation as a possible carcinogen. This makes it plausible for IARC to raise its previous classification, based mainly on epidemiological studies, to the higher category of 'probably carcinogenic' for RF exposure."

7 Lerchl, A. (2018): Synergistic effects of radiofrequency electromagnetic fields in combination with carcinogenic substances - co-carcinogenicity or tumour promotion? Project 3615S82431. Departmental research reports on radiation protection. Federal Office for Radiation Protection (BfS) (ed.), Salzgitter (BfS-RESFOR, 130/18). <http://doris.bfs.de/jspui/handle/urn:nbn:de:0221-2018011014465> (22 October 2020)

Lerchl, A.; Klose, M.; Grote, K.; Wilhelm, A.; Spathmann, O.; Fiedler, T.; Streckert, J.; Hansen, V.; Clemens, M. (2015): Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans. Biochemical and biophysical research communications 459(4), pp. 585-590

8 Lin JC (2022): Carcinogenesis from chronic exposure to radio-frequency radiation. Front. Public Health 10:1042478. <https://doi.org/10.3389/fpubh.2022.1042478>; <https://www.emfdata.org/de/dokumentationen/detail?id=259>

1.3 Account of the state of research by ICBE-EMF (International Commission on the Biological Effects of EMF), Chapter C

*"The main histopathological findings from the NTP study in male rats [18] included dose-dependent cardiomyopathy, increased occurrence of cancer and preneoplastic lesions in the heart (schwannoma and Schwann cell hyperplasia). A three-day external peer review of the NTP studies confirmed 'clear evidence of carcinogenic activity' for cardiac schwannomas in male rats and 'some evidence of carcinogenic activity' for brain gliomas and adrenal tumours following exposure to GSM- or CDMA-modulated RF radiation [21]. (...) Furthermore, a lifetime study by the Ramazzini Institute reports a significant increase in cardiac schwannomas in male rats exposed for 19 hours/day to 1800 MHz GSM-modulated RF at a field strength of 50 V/m, equivalent to a whole-body SAR of 0.1 W/kg [22]. The occurrence of Schwann cell hyperplasia in the heart was also increased in this exposure group. These findings agree with those of the NTP study and show that the strongly increasing effect of modulated RF in cardiac Schwann cells is a reproducible finding that can occur at doses far below the assumed whole-body SAR threshold of 4 W/kg."*⁹

1.4 Assessment of research in the STOA report and BioInitiative Summaries

1.4.1 STOA study 2021

In 2021, STOA, the European Parliament's technology assessment panel, published a comprehensive review prepared by a team at Italy's Ramazzini Institute. Taken together, findings from epidemiology, in vivo and in vitro studies provide evidence of cancer-causing potential, particularly in the mobile communications frequency ranges used so far for GSM, UMTS and LTE (FR1: 700-3,800 MHz).¹⁰

1.4.2 BioInitiative Report

According to Prof. Henry Lai's analysis, 78 of 125 comet assay studies (65%) showed an effect, and 224 of 346 studies of genetic effects (65%) show an effect.¹¹

Henry Lai's current analysis (383 studies up to October 2024) shows that radiofrequency radiation produces significant effects on free radicals and related processes, such as DNA damage and genetic instability, in 340 papers (89%). Even at low SAR values below 0.4 W/kg, 94 of 98 studies (96%) report effects considered central mechanisms in cancer development and cancer-promoting processes.¹²

⁹ ICBE-EMF (2022): German translation: <https://diagnose-funk.org/1937>, page 10

¹⁰ European Parliament, STUDY Panel for the Future of Science and Technology (2021): Health impact of 5G: current state of knowledge of 5G-related carcinogenic and reproductive / developmental hazards as they emerge from epidemiological studies and in vivo experimental studies, <https://www.emfdata.org/de/studien/detail?id=701>
Download the study at: <https://diagnose-funk.org/1740>. German translation of the study summary as a diagnose:funk Brennpunkt: <https://diagnose-funk.org/1789>

¹¹ <https://bioinitiative.org/research-summaries/>

¹² See <https://www.saferemr.com/2018/02/effects-of-exposure-to-electromagnetic.html>

1.5 Research findings on cancer incidence

1.5.1 Cancer promotion

MOBI-Kids study¹³: The MOBI-Kids study indicates that tumours initiated before or after birth in children, which were not caused by mobile phone use, could develop more rapidly with later mobile phone use, as the findings provide logically consistent evidence of a cancer-promoting effect.¹⁴

Kundi and Hutter (2026) demonstrate that mobile phone use has a tumour-promoting effect. The authors reviewed three large epidemiological datasets, including the MOBI-Kids study of 10-24-year-olds, and found that their results are consistent with accelerated tumour growth.¹⁵

1.5.2 Colorectal cancer

Article in Microwave News (2023): "People born around 1990 now have four times the risk of rectal cancer and twice the risk of colon cancer in their twenties compared with those born around 1950, according to the American Cancer Society.¹⁶ De-Kun Li, a senior epidemiologist and experienced EMF researcher, suspects that carrying smartphones (which continually emit radiation even in standby mode) in a front or back trouser pocket, and thus close to the rectum and lower bowel, could play a major role."¹⁷

A large analysis from Australia, Canada, England and the USA shows a massive increase in colorectal cancer among young adults. According to the study, people born around 1995 had at least four times the risk of early-onset colorectal cancer compared with those born in 1960. The data suggest a birth-cohort effect, and thus new risk factors in childhood or adolescence whose cause remains unknown.¹⁸

1.5.3 Genetic damage

A new field study by Gulati et al. (2024) from Germany demonstrates that continuous radiation from transmitters has harmful cytogenetic effects on chromosomes. This supports earlier studies describing a cancer risk. The authors write: "Cytogenetic damage, i.e. chromosomal aberrations, was significantly increased in residents with higher RF-EMF exposure. It correlated negatively

13 Castaño Vinyals G. et al (2021): Wireless phone use in childhood and adolescence and neuroepithelial brain tumours: Results from the international MOBI-Kids study, Published in: Environ Int 2021; 160: 107069 <https://doi.org/10.1016/j.envint.2021.107069>

14 Analyses and study download: <https://diagnose-funk.org/1861>

15 Kundi M, Hutter H-P (2026): Interpretation of Epidemiological Studies on the Relationship Between Mobile Phone Use and Cancer. Epidemiologia. 2026; 7(3):86 MDPI. <https://doi.org/10.3390/epidemiologia7030086>

See also Scheler/Hensinger (2022): Results of the MOBI-Kids study and their misinterpretation disseminated by the Federal Office for Radiation Protection. umwelt · medizin · gesellschaft | 35 | 3/2022

16 Siegel R. et al., Colorectal Cancer Incidence Patterns in the United States, 1974-2013, JNCI: Journal of the National Cancer Institute, Volume 109, Issue 8, August 2017, djw322, <https://doi.org/10.1093/jnci/djw322>

17 <https://microwavenews.com/news-center/de-kun-li-crc>, <https://diagnose-funk.org/1953>

18 Downham L et al. (2026): Increase of early-onset colorectal cancer: a cohort effect, JNCI: Journal of the National Cancer Institute, Volume 118, Issue 4, April 2026, Pages 751-756, <https://doi.org/10.1093/jnci/djaf238>

with distance from mobile phone base stations and positively with LTE and GSM signals from mobile phone base stations." In plain terms: the closer to the transmitter and the longer the exposure, the greater the likelihood of genetic damage.¹⁹

In a review by Weller et al. (2025), mobile phone radiation shows a clear genotoxic profile: 59% of more than 500 studies find DNA damage, more than half of them below ICNIRP exposure limits - a finding that undermines the WHO's previous narrative. This strengthens the evidence that RF-EMF influences biological processes that may be precursors to cancer.²⁰

1.5.4 Thyroid cancer

ICBE-EMF writes about the study by Luo et al. (2019): "A case-control study of mobile phone use suggests an increased risk of thyroid microcarcinomas associated with long-term use. The study showed that several genetic variants based on single-nucleotide polymorphisms (SNPs) increase the risk of thyroid cancer with mobile phone use. Increasing thyroid cancer incidence in the Nordic countries, particularly over the past two decades, has also been reported."²¹ The work by Lim et al.²² and the Robert Koch Institute (2018 forecast) document increases in thyroid cancer.

In a January 2026 article, James C. Lin demonstrates that genetic predispositions in cellular DNA repair pathways alter susceptibility to mobile phone radiation and can thus promote the development of thyroid tumours.²³

In addition, Hardell et al. (2025),²⁴ using the Swedish Cancer Registry, show a pronounced increase in thyroid cancer incidence since 1970, intensifying from 1999 onwards, and discuss a possible contribution from radiofrequency radiation from mobile phones.

1.5.5 Further studies

Kundi et al. (2024) of the Medical University of Vienna investigated the effects of mobile phone use on the oral mucosa. The findings show that radiofrequency electromagnetic

19 Gulati S, Mosgoeller W, Moldan D, Kosik P, Durdik M, Jakl L, Skorvaga M, Markova E, Kochanova D, Vigasova K, Belyaev I (2024): Evaluation of oxidative stress and genetic instability among residents near mobile phone base stations in Germany. [Evaluation of oxidative stress and genetic instability in residents near mobile phone base stations in Germany.] *Ecotoxicol Environ Saf* 2024; 279: 116486. <https://www.emfdata.org/de/studien/detail?id=847>

20 Weller et al. (2025): A scoping review and evidence map of radiofrequency field exposure and genotoxicity: assessing in vivo, in vitro, and epidemiological data. *Front. Public Health* 13:1613353. doi: 10.3389/fpubh.2025.1613353, <https://www.emfdata.org/de/studien/detail?id=910>

21 Luo J et al. (2019): Cell phone use and risk of thyroid cancer: a population-based case-control study in Connecticut. *Ann Epidemiol.* 2019;29:39-45, cited in ICBE-EMF (2022): German translation: <https://diagnose-funk.org/1937>, page 16

22 Lim et al. (2017): Trends in Thyroid Cancer Incidence and Mortality in the United States, 1974-2013, *JAMA*. <https://doi.org/10.1001/jama.2017.2719>; RKI (Robert Koch Institute) (2017): Cancer in Germany 2013/14, p. 112

23 Lin JC (2026): Increasing Incidence of Thyroid Cancer and Use of Smart Phones [Health Matters], in *IEEE Microwave Magazine*, vol. 27, no. 1, pp. 14-16, Jan. 2026, doi: 10.1109/MMM.2025.3613612. <https://www.emf-portal.org/en/article/61832>

24 Hardell L et al. (2025): The increasing incidence of thyroid cancer in Sweden revisited. *Fortune J. Health Sci.*, vol. 8, no. 3, pp. 716-722, 2025, doi: 10.26502/fjhs.328, [emfdata.org/de/studien/detail?id=918](https://www.emfdata.org/de/studien/detail?id=918)

radiation from mobile phones causes a significant increase in nuclear abnormalities, particularly binucleated cells, indicating disrupted cell division, and karyorrhectic cells, indicating cellular toxicity. These effects occurred mainly at higher radiation exposure (SAR 1.6 W/kg). These clear indications of disruption of the cell cycle and cytotoxicity mean long-term impairment of human health, up to and including cancer.²⁵

The main finding of the study by Tahmasebi et al. (2025) is that daily mobile phone calls lasting more than 60 minutes are associated with a significantly increased breast cancer risk.²⁶

Under 900 MHz exposure, Ok et al. (2024) demonstrated significant tissue damage, testicular shrinkage and a massive, up to tenfold increase in cancer-related cytokines that may regulate the development of testicular cancer.²⁷

In a pooled analysis of two studies, Hardell & Carlberg (2025) found indications that long-term use of mobile and cordless phones is associated with an increased risk of prostate cancer, particularly after more than 10 years or 2,000 hours of use. The risk was also higher for more aggressive tumours and in men with a family history of the disease.²⁸

25 Kundi et al. (2024): Mobile phone specific radiation disturbs cytokinesis and causes cell death but not acute chromosomal damage in buccal cells: Results of a controlled human intervention study, *Environmental Research* 251 (2024) 118634, <https://doi.org/10.1016/j.envres.2024.118634>, <https://www.emfdata.org/en/studies/detail?id=836>

26 Tahmasebi et al. (2025): Radiofrequency radiation from mobile phones and the risk of breast cancer: A multicenter case-control study with an additional suspected comparison group *Journal of Research in Medical Sciences*, 30(1). https://doi.org/10.4103/jrms.jrms_679_25, <https://www.emfdata.org/de/studien/detail?id=927>

27 Ok et al. (2024): Effect of 900 MHz radiofrequency electromagnetic radiation emitted from mobile phone on testicular immunity and the associated risk of testicular germ cell tumor. *Tumor Discovery* 2024, 3(1), 1703. <https://doi.org/10.36922/td.1703>, <https://www.emfdata.org/de/studien/detail?id=837>

28 Hardell L, Carlberg M (2025): Use of Mobile and Cordless Phones and the Association with Prostate Cancer. *Fortune J Health Sci* 2025; 8: 267-273. doi:10.26502/fjhs.272, <https://www.emfdata.org/de/studien/detail?id=896>

2 Cancer incidence statistics

Current incidence statistics show increases in various cancer types, correlating with the effects of radiation exposure.

2.1 Statistical analyses of cancer incidence in the ICBE-EMF article (International Commission on the Biological Effects of EMF), Chapter C

On pages 15/16, the ICBE-EMF article²⁹ provides a source-based overview of research and incidence, with the principal finding that incidence is increasing.

2.2 Cancer incidence statistics

2.2.1 Brain tumours

UK Million Women Study³⁰: The risk of a brain tumour among women who frequently use mobile phones has continually increased since 2001:

	Median year 2001 10+ years	Median year 2011 10+ years
	Relative risk (confidence interval)	Relative risk (confidence interval)
All glioblastomas	0.91 (0.78 - 1.06)	1.22 (0.95 - 1.57)
All temporal-lobe glioblastomas	0.95 (0.75 - 1.20)	1.12 (0.76 - 1.65)
Right side only	1.17 (0.87 - 1.57)	1.27 (0.84 - 1.91)
Left side only	0.94 (0.71 - 1.25)	1.21 (0.77 - 1.88)

Table 1: Source: Schüz et al. 2022

	Acoustic neuroma 10+ years
	Relative risk (confidence interval)
INTERPHONE study 2011 (p. 6)	1.32 (0.88 - 1.97)
Schüz: median year 2001	1.32 (0.89 - 1.96)
Schüz: median year 2011	Insufficient data
Benson study 2013	2.46 (1.07 - 5.64)

Table 2

29 ICBE-EMF (International Commission on the Biological Effects of Electromagnetic Fields) (2022): Scientific evidence invalidates health assumptions underlying the FCC and ICNIRP exposure limit determinations for radiofrequency radiation: implications for 5G, Environ Health 2022; 21: 92

ICBE-EMF (2022): Scientific evidence invalidates health assumptions underlying FCC (Federal Communication Commission, USA) and ICNIRP radiofrequency exposure limits: implications for 5G. German translation in diagnose:funk Brennpunkt, diagnose-funk.org/1937

30 [http://www.millionwomenstudy.org/publications/365/mobile-phone-use-and-risk-of-brain-neoplasms-and-other-cancers-prospective-study](https://www.millionwomenstudy.org/publications/365/mobile-phone-use-and-risk-of-brain-neoplasms-and-other-cancers-prospective-study); table, article and analyses at diagnose-funk.org/1864

The most aggressive form of glioma is the rare glioblastoma, which has risen sharply in recent years. Statistics for metropolitan France record 823 new cases of histologically confirmed glioblastoma in 1990 and 3,481 in 2018.³¹ Current US cancer registry data (SEER Preliminary Incidence Trends up to 2024; CBTRUS Statistical Report 2025)³² confirm that glioblastoma remains the most common malignant brain tumour type (CBTRUS: 51.5% of all malignant primary brain tumours), with no discernible decline in incidence.

Official British cancer statistics distinguish individual brain regions. During calls, the frontal and temporal lobes are immediately adjacent to the mobile phone and therefore receive particularly high radiation exposure. A study (Philips et al. 2018) consequently compared increases in glioblastoma in the frontal and temporal lobes with those in the rest of the brain. While there is no substantial increase elsewhere, the number in the heavily exposed brain regions has more than tripled. The chart from the study shows that many other causes, such as chemical exposure, can be ruled out as explanations for the glioblastoma increase, since they would have to affect all parts of the brain equally.³³

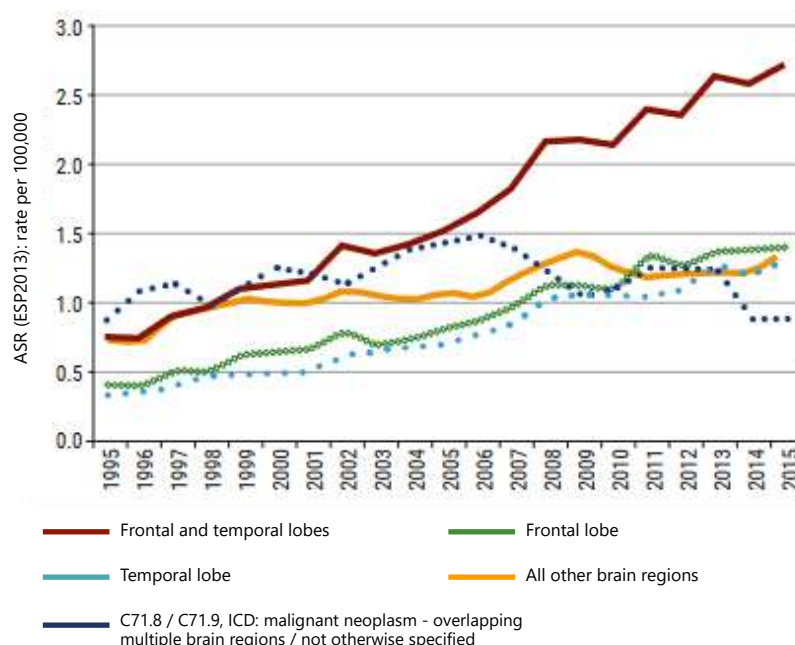


Fig. 1: Changes in age-standardised glioblastoma incidence rates in different brain regions, 1995-2015. Philips et al.⁷⁴

31 <https://www.santepubliquefrance.fr/content/download/190597/2335082?version=1>

32 <https://seer.cancer.gov/statistics/preliminary-estimates/> https://academic.oup.com/neuro-oncology/article/27/Supplement_4/iv1/8285946

33 Philips A et al. (2018): Brain tumors: rise in glioblastoma multiforme incidence in England 1995-2015 suggests an adverse environmental or lifestyle factor. Hindawi J Environ Public Health 2018 article ID 7910754, <https://www.emfdata.org/de/studien/detail?id=476>

Hardell and Carlberg demonstrated that gliomas develop more frequently on the side where the mobile phone is held during calls.³⁴

The 2022 ICBE-EMF article summarises:

"Although it has been claimed that 'current mobile phone exposure limits are acceptable for protecting public health' because 'even with frequent daily use, we have not seen an increase in events such as brain tumours in the vast majority of adults' [109], the SEER (Surveillance, Epidemiology, and End Results Program) database shows an annual decline of 0.3% for all brain tumours, but an increase of 0.3% per year for glioblastoma in the USA between 2000 and 2018.³⁵ Particularly concerning is the annual increase in glioblastoma among people under 20 of 2.7% per year of age. Furthermore, Zada et al. [110] reported that glioblastoma multiforme (GBM) incidence in the frontal lobe, temporal lobe and cerebellum increased in the USA between 1992 and 2006. Philips et al. also report a statistically significant increase in GBM in the frontal and temporal lobes of the brain in the United Kingdom between 1995 and 2015. In Sweden, brain tumour rates in the Swedish National Patient Register and Swedish Cancer Registry rose between 1998 and 2015."³⁶

The meta-analysis by Bortkiewicz et al. (2017) states: "The findings support the hypothesis that long-term mobile phone use increases the risk of intracranial tumours, particularly with ipsilateral exposure."³⁷ Analyses by Burkhamer et al. (2017) confirm this trend.³⁸ Gliomas are increasing in the Netherlands, glioblastomas in Australia and England, and all brain tumours in Spain and Sweden (Belpomme et al. 2018, p. 653).³⁹

The study by Moon et al.'s South Korean research group (2024) examined the relationship between mobile phone use and the development of brain tumours through a meta-analysis of 19 case-control and 5 cohort studies. It shows that ipsilateral use (using the phone on the side of the head where the tumour subsequently appeared) increased the risk of meningioma by 20%, glioma by 45%, and malignant tumours by 93%. Participants with more than 10 years of use had a 32% increased risk of developing glioma. With a

34 Hardell L, Carlberg M, Hedendahl L (2018): Commentary on the NTP study findings, published as a diagnose:funk Brennpunkt. First published on the NIEHS website among comments on the NTP study: https://ntp.niehs.nih.gov/ntp/about_ntp/trpanel/2018/march/publiccomm/hardell20180312.pdf

35 <https://seer.cancer.gov/explorer/>

36 ICBE-EMF (2022): German translation: <https://diagnose-funk.org/1937>, page 15

37 Bortkiewicz A, Gadzicka E, Szymczak W (2017): Mobile phone use and risk for intracranial tumors and salivary gland tumors - a meta-analysis, International Journal of Occupational Medicine and Environmental Health 2017;30(1):27-43, <https://www.emfdata.org/de/studien/detail?id=503> 38 Burkhamer J, David Kriebel D, Clapp R (2017): The increasing toll of adolescent cancer incidence in the US. PLoS ONE 12(2)

39 Belpomme D et al. (2018): Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective, Environmental Pollution, 242 (2018) 643-658

cumulative usage time of more than 896 hours, a 59% increased likelihood of brain tumours was found, regardless of tumour type.⁴⁰

The studies and reviews by Wang & Guo (2016), Prasad et al. (2017) and Yang et al. (2017) likewise consistently show that long-term or intensive mobile phone use is associated with an increased risk of glioma or brain tumours.

2.3 Statistics on increasing cancer in children and adolescents

Gittleman et al.'s analysis of US cancer statistics from 2000 to 2010 shows: "Cases of benign central nervous system tumours, however, increased significantly. By comparison, adolescents experienced an increase in malignant and benign central nervous system tumours. Children experienced an increase in acute myeloid leukaemia, non-Hodgkin lymphomas and malignant central nervous system tumours."⁴¹ (p. 111)

These observations were supported by Ostrom et al.: "In children (aged 0-14), the incidence of primary malignant brain and CNS tumours rose significantly between 2000 and 2010, with an annual percent change (APC) of 0.6%. In adolescents (aged 15-19), there was a significant increase in primary malignant brain and CNS tumour incidence between 2000 and 2008, with an APC of 1.0%. Adolescents also experienced an increase in non-malignant brain and CNS tumours from 2004 to 2010, with an APC of 3.9%."⁴² (p. 26)

More recent long-term US data up to 2022 (Cancer Discovery) now show a two-phase trend: CNS tumours continued to increase at an annual rate of +0.81% until 2014, followed by a statistical reversal, with declines of -2.10% per year up to 2022. Despite this recent decline in CNS tumours, the long-term picture remains concerning. Partly due to the continuing increase in lymphomas and leukaemias, an estimated 1,040 additional cancer diagnoses in children and adolescents were recorded in the USA in 2022 compared with 2001.⁴³

This development is also reflected in European and global long-term data. In its ongoing analyses, the German Childhood Cancer Registry (DKKR) documents a long-term increase in cases across all malignant diseases in children and adolescents in Germany. Compared with historical records from the 1980s, the number of new cases registered annually rose in the long-term trend

40 Moon et al. (2024): Relationship between radiofrequency electromagnetic radiation from cellular phones and brain tumor: meta-analyses using various proxies for RF-EMR exposure-outcome assessment, *Environmental Health* 23, Article number: 82 (2024), <https://doi.org/10.1186/s12940-024-01117-8> <https://www.emfdata.org/de/studien/detail?id=866>

41 Gittleman HR et al. (2015): Trends in Central Nervous System Tumor Incidence Relative to Other Common Cancers in Adults, Adolescents, and Children in the United States, 2000 to 2010. *Cancer* 1-2015, pp. 102 ff.

42 Ostrom QT et al. (2015): CBTRUS Statistical Report: Primary Brain and Central Nervous System Tumors Diagnosed in the United States in 2008-2012, *Neuro-Oncology* 17:iv1-iv62, 2015. <https://doi.org/10.1093/neuonc/nov189>

43 See Shiels, M. S. et al. (2026): Trends in Childhood and Adolescent Cancer Incidence Rates in the United States between 2001 and 2022. *Cancer Discov.* 2026 Apr 1;16(4):686-696. Available online at: <https://pmc.ncbi.nlm.nih.gov/articles/PMC12820769/>

by around 25-30%.⁴⁴ Internationally, this trend is confirmed by the International Agency for Research on Cancer: through its worldwide International Incidence of Childhood Cancer project,⁴⁵ the WHO's IARC reports a global increase in childhood cancer of 13% over recent decades. Currently, around 2,350 children and adolescents under 18 develop cancer each year in Germany, corresponding to a lifetime risk of about 1 in 330 by adulthood.

Testicular cancer incidence in adolescents and young adults is increasing worldwide. **The study by van der Meer et al. (2024)** aimed to provide a detailed overview of trends in testicular cancer diagnosed in the Netherlands between 1989 and 2019. It demonstrates that the number of adolescents and young adults developing testicular cancer is increasing. Between 1989 and 2019, 12,528 cases were registered in the Netherlands among adolescents and young adults aged 18-39. Comparing 1989-99 with 2010-19 showed increases in both seminomas (malignant tumours arising from transformed spermatogonia) and non-seminomas. In 2010-19, seminomas occurred most frequently among 30-34-year-olds, and non-seminomas (various malignant tumour types not arising from spermatogonia) among 25-29-year-olds.⁴⁶

2.4 Further documentation of studies and incidence of brain tumours

Davis D, Birnbaum L, Ben-Ishai P, Taylor H, Sears M, Butler T, Scarato T (2023): Wireless technologies, non-ionizing electromagnetic fields and children: Identifying and reducing health risks, *Curr Probl Pediatr Adolesc Health Care* 2023; 53 (2): 101374; see pp. 20-24⁴⁷

Meta-study: Choi YJ, Moskowitz JM, Myung SK, Lee YR, Hong YC (2020): Cellular Phone Use and Risk of Tumors: Systematic Review and Meta-Analysis, *Int J Environ Res Public Health* 2020; 17 (21): E8079, full text: <https://www.emf-portal.org/de/article/43624>

Wang et al. (2016): Meta-analysis of association between mobile phone use and glioma risk. *J Cancer Res Ther.* 2016 Dec;12(Supplement):C298-C300. doi: 10.4103/09731482.200759. PMID: 28230042, <https://www.emf-portal.org/de/article/31405>

Prasad et al. (2017): Mobile phone use and risk of brain tumours: a systematic review of association between study quality, source of funding, and research outcomes. *Neurol Sci.* 2017 May;38(5):797-810. doi: 10.1007/s10072-017-2850-8. Epub 2017 Feb 17. PMID: 28213724, <https://www.emf-portal.org/de/article/31341>

44 Download: https://www.kinderkrebsregister.de/fileadmin/kliniken/dkkr/pdf/presse/Short_report_2025_20260507.pdf

45 See <https://iicc.iarc.fr/>

46 van der Meer DJ et al. (2024): The increasing burden of testicular seminomas and non-seminomas in adolescents and young adults (AYAs): incidence, treatment, disease-specific survival and mortality trends in the Netherlands between 1989 and 2019. *ESMO* 2024, <https://doi.org/10.1016/j.esmoop.2023.102231>

47 Davis D, Birnbaum L, Ben-Ishai P, Taylor H, Sears M, Butler T, Scarato T (2023): Wireless technologies, nonionizing electromagnetic fields and children: Identifying and reducing health risks, *Curr Probl Pediatr Adolesc Health Care* 2023; 53 (2): 101374; Brennpunkt: diagnose-funk.org/2004

Yang et al. (2017): Mobile phone use and glioma risk: A systematic review and meta-analysis. PLoS ONE 12(5): e0175136. <https://doi.org/10.1371/journal.pone.0175136>, <https://www.emf-portal.org/de/article/31835>

Website of Joel M. Moskowitz, Ph.D., Director, Center for Family and Community Health, School of Public Health, University of California, Berkeley: <https://www.saferemr.com/2015/04/the-incidence-of-meningioma-non.html>

3 Political debate on the assessment of research findings

From 2020 to 2022, the federal government and the BfS ran public campaigns, including "Germany talks about 5G", denying that there is a cancer risk. Diagnose:funk analyses these campaigns in the Brennpunkt "The struggle over authority to interpret the risks of mobile phone radiation", available for download under Publications on our website.

To provide a sound foundation for reassessment, the WHO has commissioned a series of comprehensive systematic reviews and meta-analyses in recent years to assess worldwide research on various health endpoints. The results of the submitted meta-studies have prompted fierce controversy, which we document at diagnose-funk.org/forschung/entwicklungen-ereignisse/rueckblicke/historie-der-krebsdebatte.

On 6 September 2024, a worldwide press campaign swept through the media. Its central claim: according to the WHO, mobile phone radiation poses no health risks whatsoever. This reporting was based on a systematic review of epidemiological studies by Karipidis et al. (2024), prepared with participation from Germany's Federal Office for Radiation Protection (BfS) and members of the International Commission on Non-Ionizing Radiation Protection (ICNIRP), among others. The media message was unambiguous, suggesting that the WHO, as the leading health authority, had now officially declared mobile phone use safe. However, the Karipidis et al. (2024) review is limited to epidemiological studies. Letters to the Editor call on the WHO to withdraw the Karipidis study because of methodological errors.⁴⁸

In fact, the WHO had not officially commented on the study findings at that time. The supposed reassurance was instead based on an erroneous report by the German Press Agency (dpa) and press releases from the Federal Office for Radiation Protection. Although the BfS has since officially corrected the error internally,

48 Karipidis K, Baaken D, Loney T, Blettner M, Brzozek C, Elwood M, Narh C, Orsini N, Rösli M, Paulo MS, Lagorio S (2024): The effect of exposure to radiofrequency fields on cancer risk in the general and working population: A systematic review of human observational studies - Part I: Most researched outcomes, Environ Int 2024; 191: 108983
Letters to the Editor (2021-2026): Letters concerning the WHO studies are collected here: <https://www.sciencedirect.com/special-issue/1092DR596MG>

MicrowaveNews (2024): Old Wine in New Bottles - Decoding New WHO-ICNIRP Cancer Review - Game Over? Likely Not, <https://www.microwavenews.com/news-center/old-wine-new-bottles>

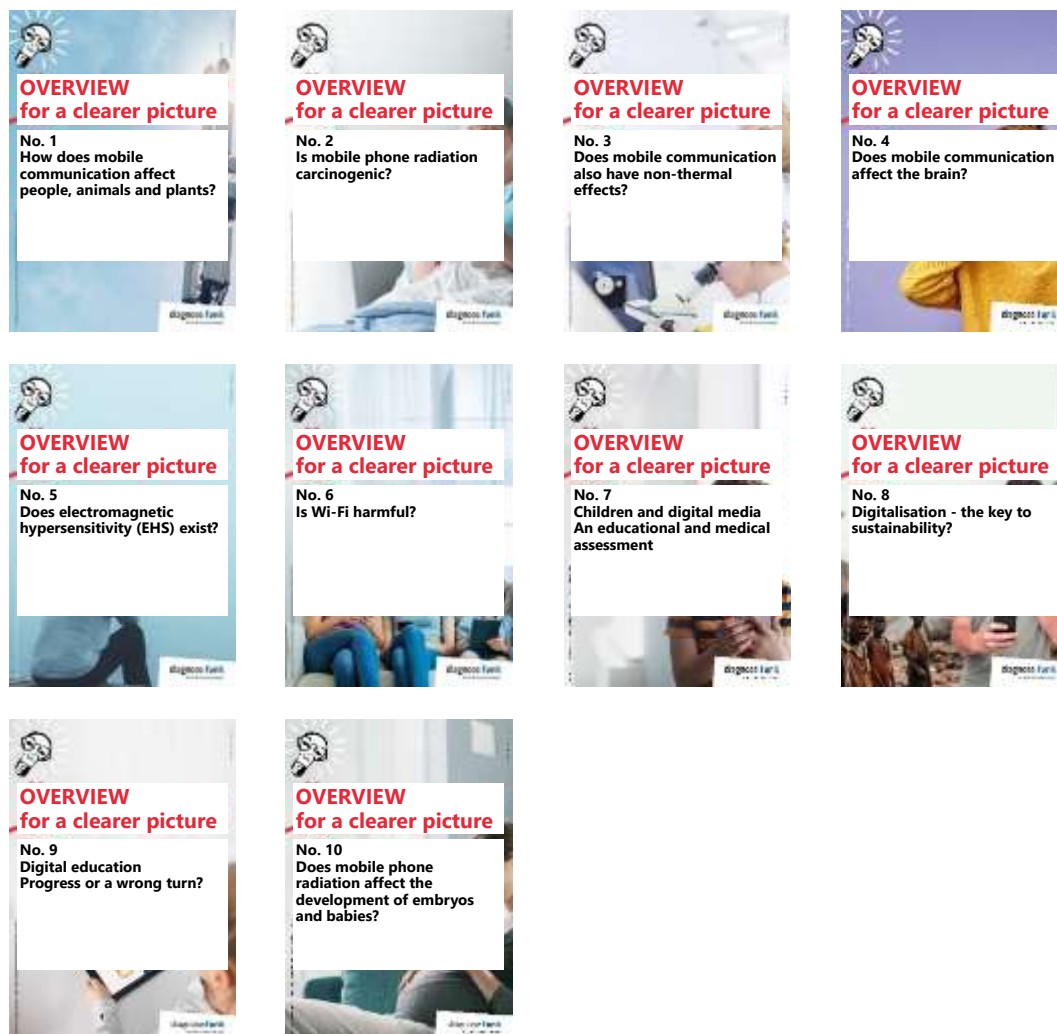
as we document on our website,⁴⁹ no public correction has been issued. Only a few months later, in April 2025, another WHO review followed, by Mevissen et al. (2025).⁵⁰ This paper reached a diametrically opposite conclusion: the assessment of available animal studies showed consistent indications of **genotoxic effects** from mobile phone radiation and thus did indeed indicate an actual cancer hazard.

⁴⁹ <https://diagnose-funk.org/2143>

⁵⁰ Mevissen et al. (2025): Effects of radiofrequency electromagnetic field exposure on cancer in laboratory animal studies, a systematic review. Environ Int. 2025 May;199:109482. doi:10.1016/j.envint.2025.109482, <https://www.emfdata.org/de/studien/detail?id=897>

Mevissen M et al. (2026): Corrigendum to "Effects of radiofrequency electromagnetic field exposure on cancer in laboratory animal studies, a systematic review" (Environ Int 199, 2025, 109482). Environment International, 110368 (in press).

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