



**Worldwide list of all peer-reviewed scientific studies of human health around mobile phone base stations, as of end May 2020. Out of 33 studies, 32 (or 97%) report health problems.**

**Compiled by Karl Muller.**

**1. Santini et al. (2002) Five hundred and thirty people living near mobile phone base stations in France reported headaches, sleep disturbances, discomfort, irritability, depression, memory loss, and concentration problems. These effects were more pronounced the closer people lived to the mast.**

**2. Navarro et al. (2003) This Spanish study found that the greater the power density of microwaves in the home, the more severe were complaints of depression, fatigue, sleeping disorders, concentration problems, headaches, irritability, memory problems, loss of appetite, nausea, audio and visual dysfunction, dizziness, and cardiovascular problems.**

**3. Bortkiewicz et al. (2004) This Polish study confirmed that residents living close to mobile phone masts reported "Various complaints mostly of the circulatory system, but also of sleep disturbances, irritability, depression, blurred vision, concentration difficulties, nausea, lack of appetite, headache and vertigo. The study shows relationships between the incidence of individual symptoms, the level of exposure, and the distance between a residential area and a base station. This association was observed both in persons who linked their complaints with the presence of the base station and those who did not notice such a relation."**

**4. Eger et al. (2004) This study, commissioned by the German Federal Agency for Radiation Protection, compiled medical histories between 1994–2004 of people living in Naila, Bavaria. The study found a threefold increase in malignant tumours for people exposed for five years or more to cellphone masts within 400 metres, compared with people living further away.**

**5. Rösli (2004) This Swiss survey study reported that out of 429 questionnaires returned, 394 people reported symptoms from mobile phone tower exposure. Fifty-eight percent of these symptomatic people suffered headaches, 19% nervous stress, and 18% fatigue, while concentration difficulties were the most common complaint.**

**6. Wolf and Wolf (2004) A Tel Aviv University study of 622 people living in Netanya, Israel, revealed an overall fourfold increase in the incidence of cancer among residents living within 350 metres of a cellphone mast for a period of between three and seven years. Among women in the 350-metre group, the increase in cancer was 10 times the norm, compared with people living in other areas of the city.**

**7. Hutter et al. (2005) Three hundred and sixty-five people living near 10 cellphone masts in urban and rural Austria were studied. Reported symptoms of radiation included: headache, vertigo, tremors, cold hands and feet, exhaustion, difficulty concentrating, stress, and the urge for sleep. Radiation levels were 0.2 to 0.4 volts per metre, hundreds of times lower than legal US exposure standards of 47 to 61 volts per metre. Higher exposures showed higher percentages of health complaints.**



8. Abdel-Rassoul et al. (2006) Residents living beneath or adjacent to a long-established mobile phone mast with numerous antennas in Egypt reported significantly higher occurrences of headaches, memory changes, dizziness, tremors, depressive symptoms and sleep disturbance than did a control group.

9. Meyer et al. (2006) compared the cancer incidence among 177,428 persons living in 48 municipalities in Bavaria between 2002 and 2003 in relation to base station coverage. "Cancer incidence was not found to be elevated in municipalities with cellular telephone relay stations. The cancer incidence was highly variable in areas without any relay station." This is the only study of human health around base stations that did not find any problems.

10. Preece et al. (2007) A study of three villages in Cyprus found "a considerable excess of migraine, headache and dizziness, which appears to share a gradient with radiofrequency exposure" that was mostly due to mobile phone base station radiation.

11. Eger et al. (2009) The Bavarian town of Selbitz conducted a health survey of 251 residents exposed to cell tower radiation at no more than 1 volt per metre. The study found a significant correlation, depending on dose exposure, for: insomnia, depression, cerebral symptoms, joint illnesses, infections, skin changes, heart and circulation disorders, disorders of vision/hearing, and gastrointestinal problems.

12. Kundi and Hutter (2009) This important independent review of base station studies reported "strong indications that long-term exposure near base stations affects wellbeing. Symptoms most often associated with exposure were headaches, concentration difficulties, restlessness, and tremor. Sleeping problems were also related to distance from base station or power density."

13. Leitgeb et al. (2008) This study looked at the sleep patterns of 43 subjects when true- and sham-shielded from base station radiation in their homes. Four of the subjects showed dramatic changes in sleep patterns when exposed to the radiation.

14. Augner and Hacker (2009) This study examined relationships among 57 subjects to see if they were affected by living near base stations. Those reporting living near base stations "had significantly higher concentrations of alpha-amylase in their saliva, higher rates in symptom checklist subscales somatization, obsessive-compulsive, anxiety, phobic anxiety, and global strain index PST (Positive Symptom Total) ... EMF-related health concerns cannot explain these findings."

15. Elliott et al. (2010) For this study, researchers from Imperial College London looked at almost 7,000 children and explored whether there was any correlation between a mother living near a mobile phone base station during her pregnancy and that child's risk of developing cancer. While the study claimed not to find a pattern, there was in fact a 16% increase in childhood leukaemias at intermediate distances from towers.

16. Khurana et al. (2010) This independent review looked at ten epidemiological studies: "We found that eight of the 10 studies reported increased prevalence of adverse neurobehavioral symptoms or cancer in populations living at distances under 500 metres from base stations. None of the studies reported exposure above accepted international guidelines, suggesting that current guidelines may be inadequate in protecting the health of human populations."

17. Levitt and Lai (2010) This independent review looked at reports and studies indicating "headaches, skin rashes, sleep disturbances, depression, decreased libido, increased rates of suicide, concentration problems, dizziness, memory changes, increased risk of cancer, tremors, and other neurophysiological effects in populations near base stations."



18. Dode et al. (2011) This study looked at 7191 deaths by cancer in Brazil's third-largest city, Belo Horizonte, between 1996 and 2006. The highest rate of deaths from cancer was found among those who had lived within 500 metres of cellphone masts; there was a 35% increase in cancers for those living within 100 metres. There were high rates of prostate, breast, lung, kidney and liver cancer among the victims living closest to masts.

19. Buchner et al. (2011) In this study conducted in Bavaria, Germany, urine samples of 60 study participants were analysed for their adrenaline, noradrenaline, dopamine, and phenylethylamine (PEA) levels before and after the activation of a new GSM cell tower. After activation, the stress hormone levels increased significantly, while dopamine and PEA levels decreased substantially. Sleep problems, headaches, allergies, dizziness, and concentration problems were common. This study indicates that base station radiation induces radical dose-responsive changes in human stress hormones.

20. Li et al. (2012) This Taiwanese study focused on childhood tumours in relation to RF exposure from cell towers erected between 1998 and 2007. Researchers calculated the annual power emitted by all 71,185 cell towers in Taiwan and compared the calculated exposure of populations in each irradiated township: "This study noted a significantly increased risk of all tumours in children with higher-than-median RF exposure to mobile phone base stations."

21. Eskander et al. (2012) This Egyptian cellphone tower study focused on the changes in human hormone profiles. Blood samples were taken from volunteers prior to the installation of a base station. Following installation, ongoing samples were taken which showed a significant decrease in volunteers' ACTH, cortisol, thyroid hormones, prolactin for young females, and testosterone levels.

22. Navarro et al. (2013) An extension of their earlier study, this found significant correlations with lack of appetite; lack of concentration; irritability; and trouble sleeping. Controls for demographic factors and other possible risk factors were applied. Concerns about exposure did not affect the strong and direct association between exposure and sleep disorders.

23. Shahbazi et al. (2014) This Iranian study was conducted on 250 randomly selected people living near cell towers. Statistically significant symptoms included: nausea, headache, dizziness, irritability, discomfort, nervousness, depression, sleep disturbances, memory loss, and lack of libido among people living within 300 metres of the cellphone towers, compared with those living further away. While this paper appears to have been retracted for no given reason, it is recorded here for interest, given the health situation in Iran with the COVID-19 outbreak.

24. Gandhi et al. (2014) This case-control study evaluated genetic damage in individuals living in the vicinity of cellphone towers. The blood of irradiated subjects showed significantly elevated DNA damage compared with non-irradiated control subjects matched for gender, age, and other factors. Females were especially affected by cellphone tower DNA damage.

25. Shiniyo et al. (2014) This study documents the myriad serious health effects suffered by condominium inhabitants living under rooftop antennas in Japan, who were examined by medical professionals. Every single one of a long list of illnesses suffered by the residents during their years of exposure improved after the antennas were deactivated. The symptoms ascribed to microwave radiation include numerous neurological dysfunctions, eye damage, severe fatigue, and tumours.

26. Meo et al. (2015) This Saudi Arabian study examined 159 students with varying exposure to base station radiation and found significantly elevated levels of glycolated haemoglobin (HbA1c) and risk of type 2 diabetes among those with high exposures.



27. Pachua (2014) This Indian study looked at 64 adults living at varying distances from a base station. Complaints of fatigue, nausea, dizziness and muscle pain were significantly higher from those living within 50 metres of the base station.

28. Golati et al. (2016) Scientists studied 116 persons exposed to radiation from mobile towers and 106 control subjects. The researchers looked for DNA damage in peripheral blood lymphocytes using alkaline comet assay and micronucleus assay in mouth tissue cells. They found significant DNA damage among cellphone tower subjects as compared with the non-irradiated control group, including increased micronucleus frequencies. Micronuclei are known precursors for cancer.

29. Prakash et al. (2016) This study of 181 inhabitants of Bangalore found that “headache, irritability, nausea, appetite loss, discomfort, sleep disturbance, depression, memory loss difficulty in concentration and dizziness, etc., are more frequently observed symptoms of ill-health in the exposed groups. It is concluded that the cell phones and cell phone tower radiation are a strong risk factor for all the adverse health effects.”

30. Singh et al. (2016) This Indian study examined the general health and salivary function of 20 persons living near base stations and 20 on their periphery. “It was unveiled that a majority of the subjects who were residing near the mobile base station complained of sleep disturbances, headache, dizziness, irritability, concentration difficulties, and hypertension. A majority of the study subjects had significantly lesser stimulated salivary secretion ( $P < 0.01$ ) as compared to the control subjects.”

31. Siersma et al. (2016) Medical scientists from Denmark and Sweden launched an electronic questionnaire posted to special interest websites. The questionnaire requested feedback on symptoms suffered by people exposed to cell phones, Wi-Fi, occupational radiation, energy-saving light bulbs and cell towers. Of 60 respondents, significant associations were noted for both chronic exposure to Wi-Fi and for cell tower exposure. Symptoms associated with tower antennas included: cognitive, head, eye, body and skin problems. The report noted: “Mobile phone towers seem to be the most problematic of the various EMF exposures.”

32. Zothansiyama et al. (2017) looked at cultured human peripheral blood lymphocytes of individuals residing in the vicinity of mobile phone base stations, compared with healthy controls. This Indian study matched the groups for various demographic data including age, gender, dietary pattern, smoking habit, alcohol consumption, duration of mobile phone use and average daily mobile phone use. The 40 exposed subjects showed significantly higher frequencies of micronuclei, changes in glutathione, and increased oxidative stress, compared with controls.

33. Meo et al. (2018) This Saudi Arabian study examined 217 students at two schools with varying exposures to base station radiation. Significant impairment in motor screening tasks and spatial working memory tasks was identified among the group of students who were exposed to high levels of base station radiation. “High exposure was associated with delayed fine and gross motor skills, spatial working memory, and attention in school adolescents compared to students who were exposed to low RF-EMF.”

