

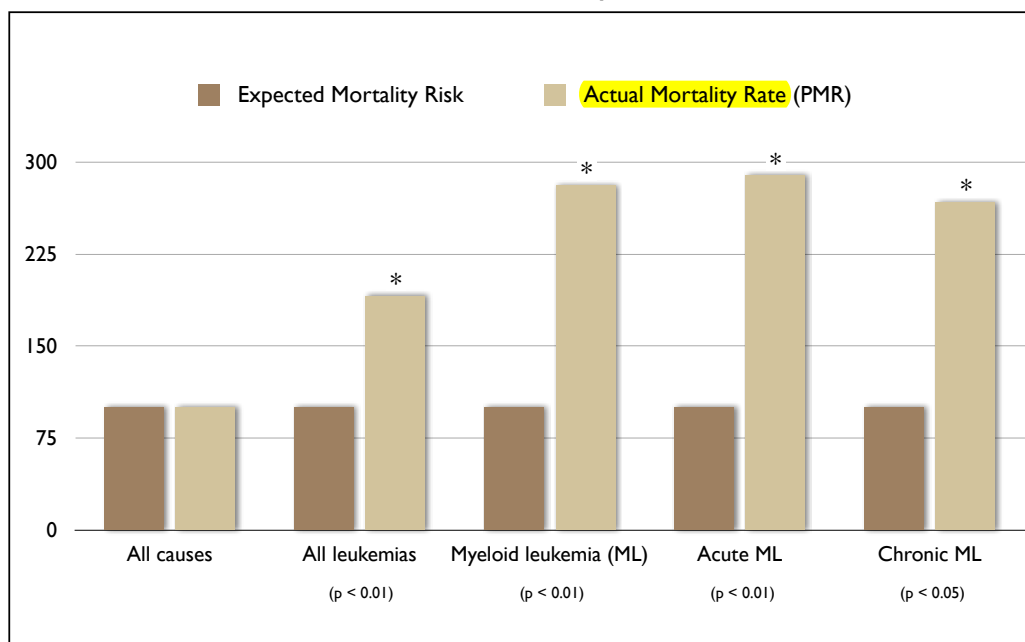
Consequences of **Chronic** Microwave RF Exposure



Fig. 2. Geographical location of BS Site BH 20 at 1373 Rua do Ouro Street, in the Serra neighborhood, Belo Horizonte municipality

Dode AC, Leao MM, Tejo Fde A et al. Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. *Sci Total Environ* (2011); 409(19):3649-3665.

Amateur Radio Operators

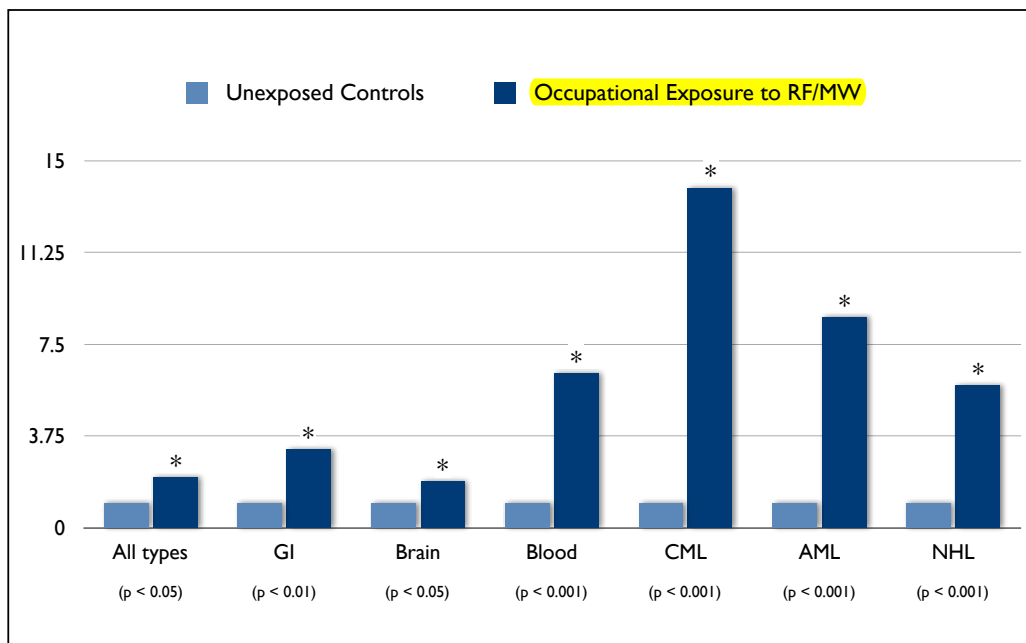


Analysis of leukemia deaths in male members of the American Radio Relay League resident in Washington and California, 1971-1983

Milham SJ. Silent keys: leukaemia mortality in amateur radio operators. *Lancet* (1985); 1(8432):812.

Cherry N. Evidence in support of the a priori hypothesis that Electromagnetic Radiation across the spectrum is a Ubiquitous Universal Genotoxic Carcinogen. (2002):1-52. <http://www.neilcherry.com/documents.php>

Polish Military (1971-1985)



Polish military personnel with occupational exposure to radio and microwave frequency radiation.

Odds ratio of cancer incidence (1971-1985)

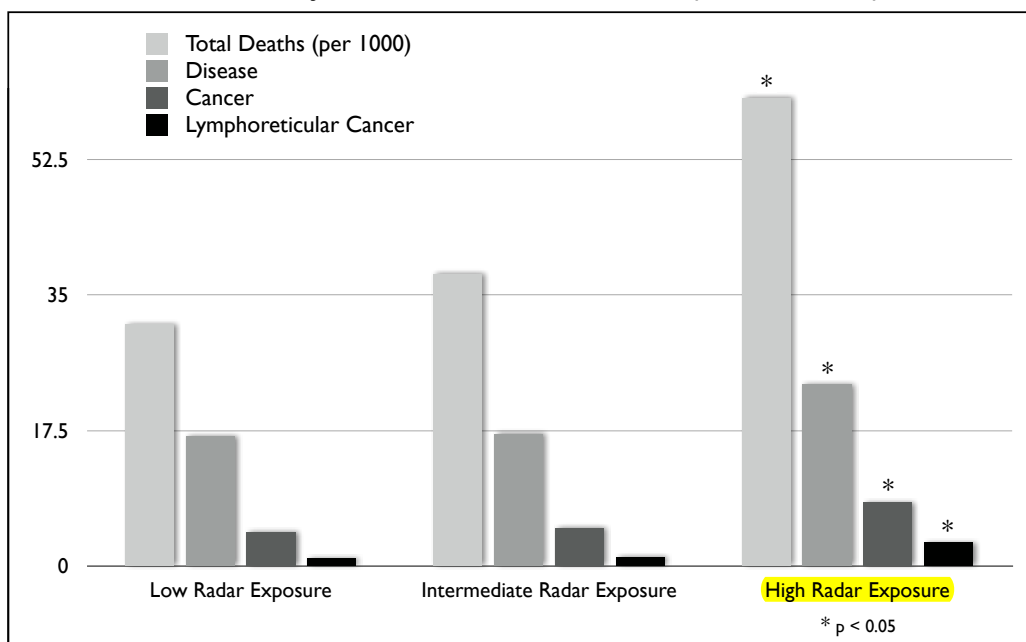
CML = chronic myelocytic leukemia

AML = acute myeloblastic leukemia

NHL = non-Hodgkin lymphoma

Szmigielski S. Cancer morbidity in subjects occupationally exposed to high frequency (radiofrequency and microwave) electromagnetic radiation. *Sci Total Environ* (1996); 180(1):9-17.

U.S. Navy Korean War Veterans (1950-1974)



Mortality in U.S. Navy Korean War Veterans (1950-1974) stratified by levels of occupational radar exposure.

Mortality 1950-1974. (Y axis = crude mortality per 1000) Stratified by level of radar exposure.

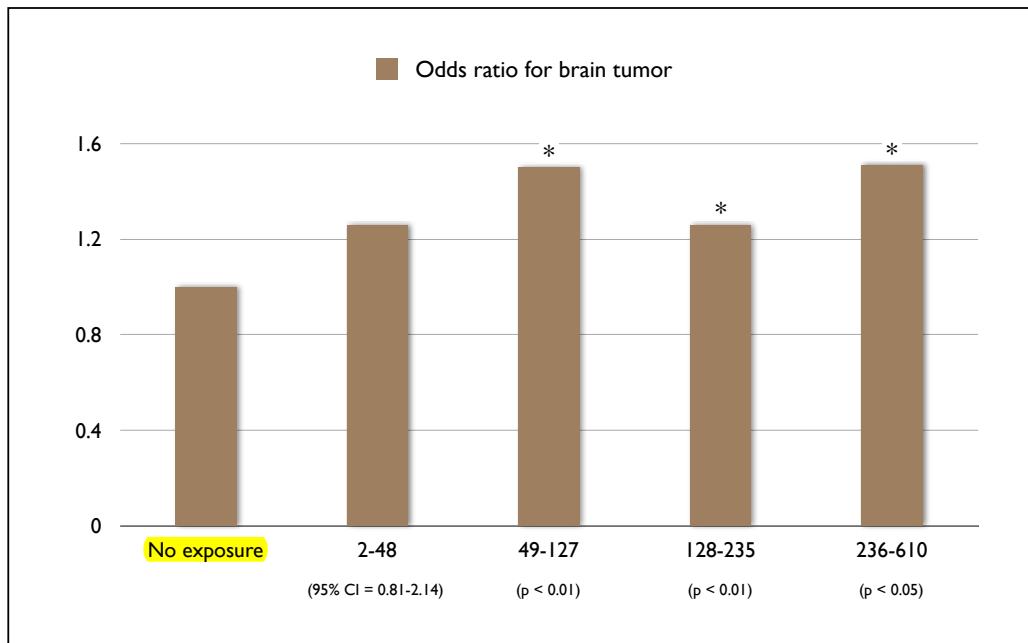
In the original paper, Robinette et al evaluated job exposure hazard levels of 6 categories of navy personnel and grouped them into two groups, low exposure and high exposure. The electronic technicians (ET) had a significantly lower hazard rating and lower levels of pathology than the other two job categories in the high risk group, so this classification diluted out the high exposure risk pool.

Dr. Cherry took Robinette et al's published data and divided the workers into three exposure levels. The above chart is the result of Dr. Cherry's analysis of the data set.

Robinette CD, Silverman C, Jablon S. Effects upon health of occupational exposure to microwave radiation (radar). *Am J Epidemiol* (1980); 112(1):39-53.

Cherry N. Health Effects in the vicinity of Radio/TV towers and mobile phone base stations. (2002): 1-40. <http://www.neilcherry.com/documents.php>

US Air Force (1970-1989)



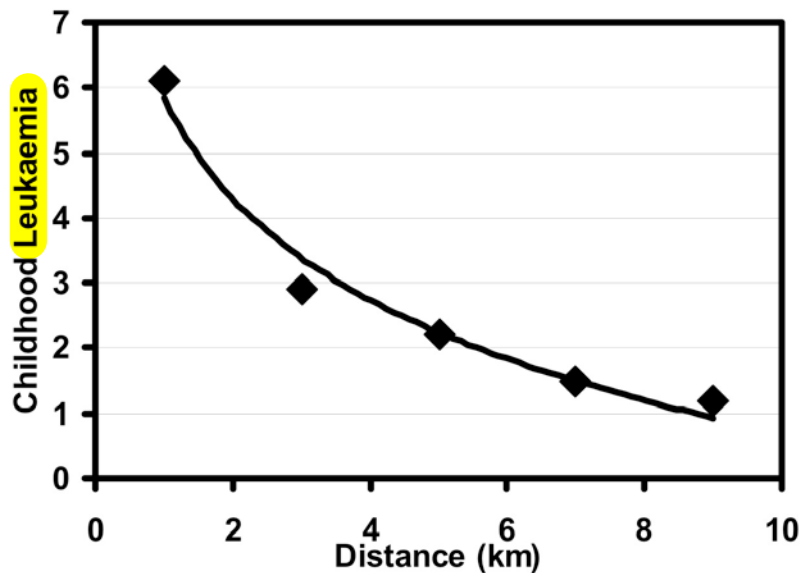
US Air Force Workers with occupational exposure to microwave RF (1970-1989)

Y axis: Odds ratio for brain tumor

X axis: Exposure intensity score x months exposed)

 Grayson JK. Radiation exposure, socioeconomic status, and brain tumor risk in the US Air Force: a nested case-control study. *Am J Epidemiol* (1996); 143(5):480-486.

Vatican Radio Tower (1987-1999).



Cumulative childhood leukaemia near the Vatican Radio Transmitters in Rome, 1987-1999.

Multiple powerful transmitters on site.

10 km radius around towers contains a population of >49,650 (1990 census).

exponential fitted trend line, $R^2=0.9756$, $p = 0.002$

Cherry N. Health Effects in the vicinity of Radio/TV towers and mobile phone base stations. (2002): 1-40.
<http://www.neilcherry.com/documents.php>

Michelozzi P, Capon A, Kirchmayer U et al. Adult and childhood leukemia near a high-power radio station in Rome, Italy. *Am J Epidemiol* (2002); 155(12):1096-1103.

Netanya, Israel (1997-1998)



New cell phone tower set up in city of Netanya, Israel, in July, 1996.

1500 watt, 850 MHz.

Power density in the whole exposed area was far below $0.53 \mu\text{W}/\text{cm}^2$.

This is 1000 times less than the FCC Guidelines of $600 \mu\text{W}/\text{cm}^2$ for 850 MHz exposure.

Comparison of cancer rates during the second year of exposure, in 677 long-term residents near the tower, compared to 1,222 matched controls living in another area of the city.

Wolf R, Wolf D. Increased Incidence of Cancer Near a Cell-Phone Transmitter Station. *International Journal of Cancer Prevention* (2004); 1(2):1-19.

Netanya, Israel - Relative Cancer Risk



Relative risk of cancer in residents near a new cell phone tower in Netanya, Israel, during the second year of exposure.

Overall risk of cancer in Area A was 4.15 times higher than in the town as a whole.

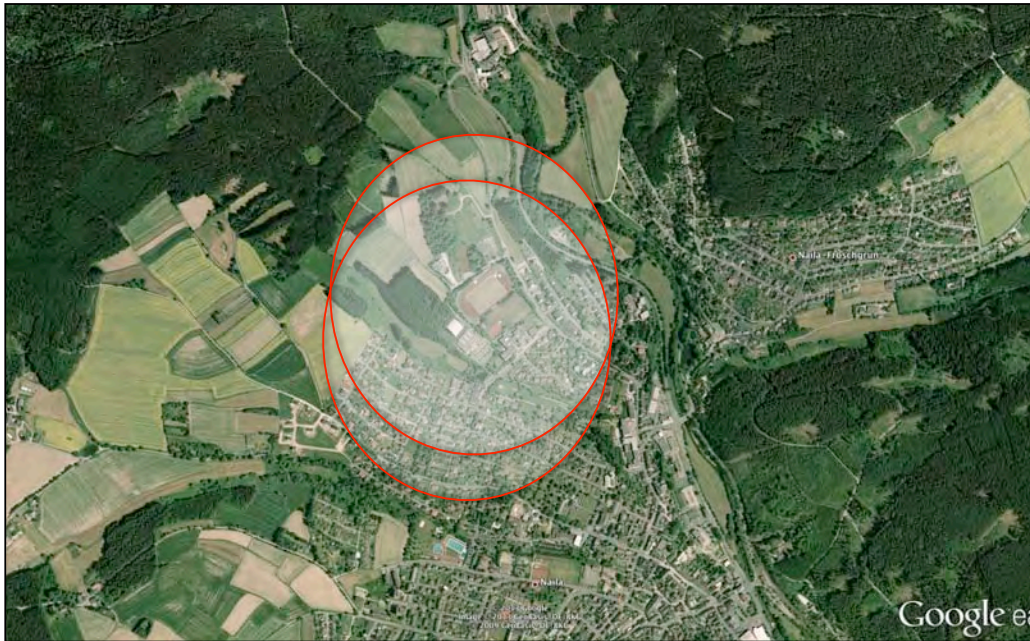
For men in area A, the cancer rate was 1.4 times higher.

For women in area A, the cancer rate was 10.5 times higher (p < 0.0001)

[the probability of this being a random finding is one hundredth of 1%

Wolf R, Wolf D. Increased Incidence of Cancer Near a Cell-Phone Transmitter Station. *International Journal of Cancer Prevention* (2004); 1(2):1-19.

Naila, Germany (1999-2004)



Town of ~ 1100 residents.

Cell tower installed in 1993.

Medical of 1000 residents reviewed for the years 1994–2004.

Comparison of cancer incidents in residents living within 400 meters of the cell phone tower, compared to residents living farther away, and compared to the death rates for the province as a whole.

Eger H, Hagen K, Lucas B, Vogel P, Voit H. The Influence of Being Physically Near to a Cell Phone Transmission Mast on the Incidence of Cancer. *Umwelt-Medizin-Gesellschaft* (2004); 17(4):1-7.

Cancer Incidence in Naila (1999-2004)

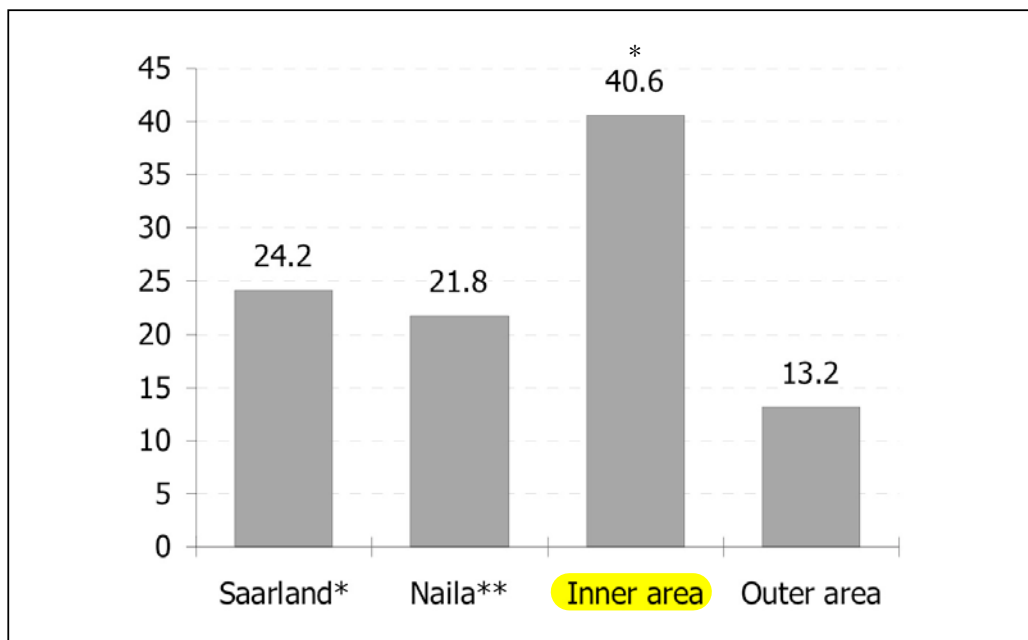


Fig. 3 : Number of new cancer cases 1999 to 2004, adjusted for age and gender, calculated for the 5,000 patient years

Y axis: Cancer incidence 1994 – 2004 (new cases per 5000 patient years).

* Saarland = predicted rate based on the cancer registry for the federal state of Saarland.

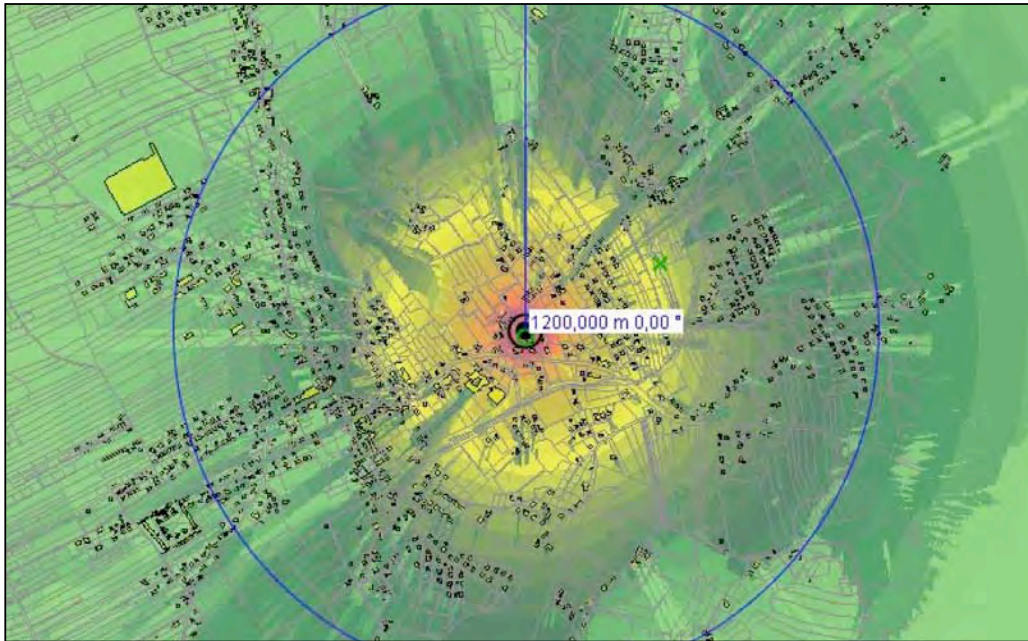
** Naila = incidence for the town as a whole.

Inner area = residence within 400 meters of the tower.

Outer area = remainder of community.

In the inner area, the risk of cancer incidence was three times as high after five or more years of exposure. In addition, the patients that live within 400 metres tend to develop the cancers at a younger age.

Hausmannstätten & Vasoldsberg, Austria (1984-1997)

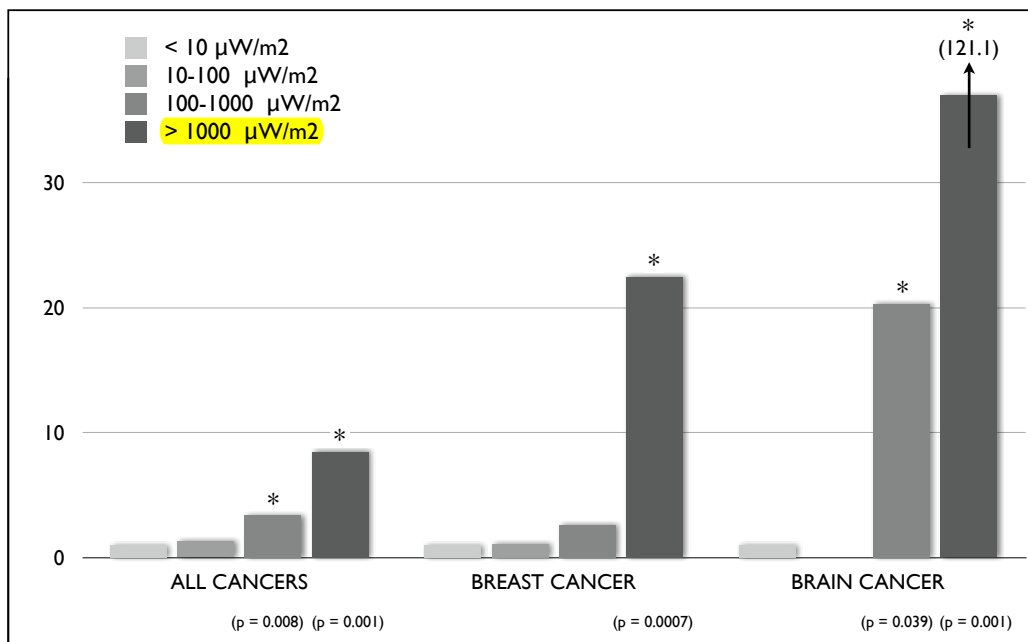


NMT 450 cell tower, operational from 1984–1997.

Case/control study of cancer patients living within 1200 meter radius of the tower.

Oberfeld G. Environmental Epidemiological Study of Cancer Incidence in the Municipalities of Hausmannstätten & Vasoldsberg (Austria). Provincial Government of Styria, Department 8B, Provincial Public Health Office, Graz, Austria (2008):1-10. <http://www.emf-health.com/PDFreports/Austrianstudy.pdf>

Hausmannstätten & Vasoldsberg, Austria (1984-1997)



Odds ratio of cancer incidence — stratified by exposure levels (exterior to dwelling) in μW/m² .

Note: FCC thermal safety guidelines ~ 6,000,000 μW/m²)

In the highest exposure category:

Breast cancer risk was 23 times higher,

Brain cancer risk was 121 times higher.

Oberfeld G. Environmental Epidemiological Study of Cancer Incidence in the Municipalities of Hausmannstätten & Vasoldsberg (Austria). Provincial Government of Styria, Department 8B, Provincial Public Health Office, Graz, Austria (2008):1-10. <http://www.emf-health.com/PDFreports/Austrianstudy.pdf>

Belo Horizonte, Brazil (2011)

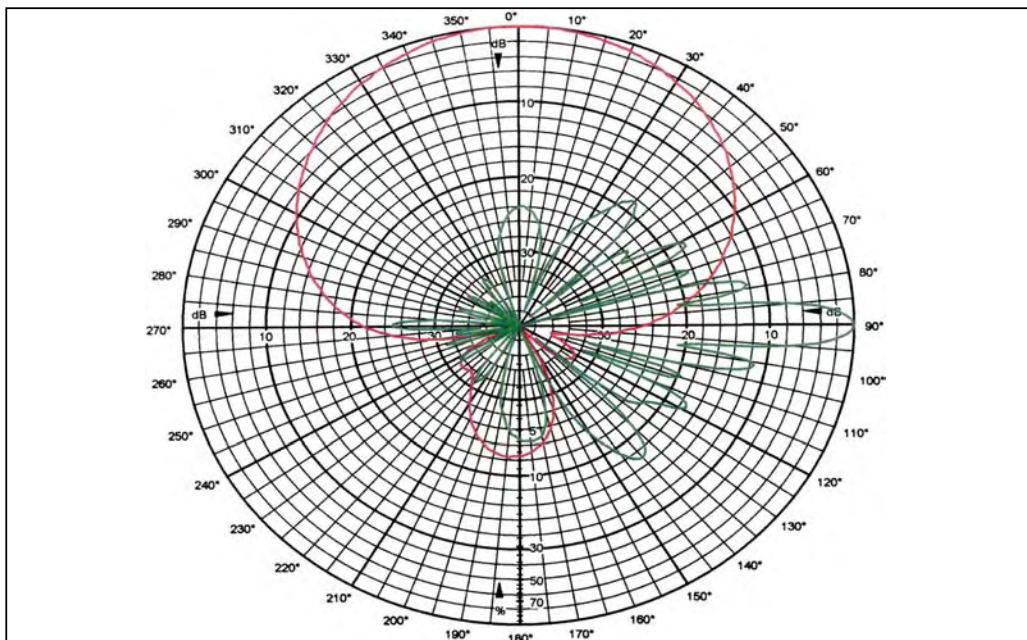


Belo Horizonte is the capital of Minas Gerais state in Brazil, population 2,258,096 in 2010.

Rated by the U.N. in 2007 as having the best quality of life in Latin America.

By 2006, 856 cell phone towers had been installed in the city.

Dode AC, Leao MM, Tejo Fde A et al. Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. *Sci Total Environ* (2011); 409(19):3649-3665.



Environmental monitoring of RF power densities in the city was performed.

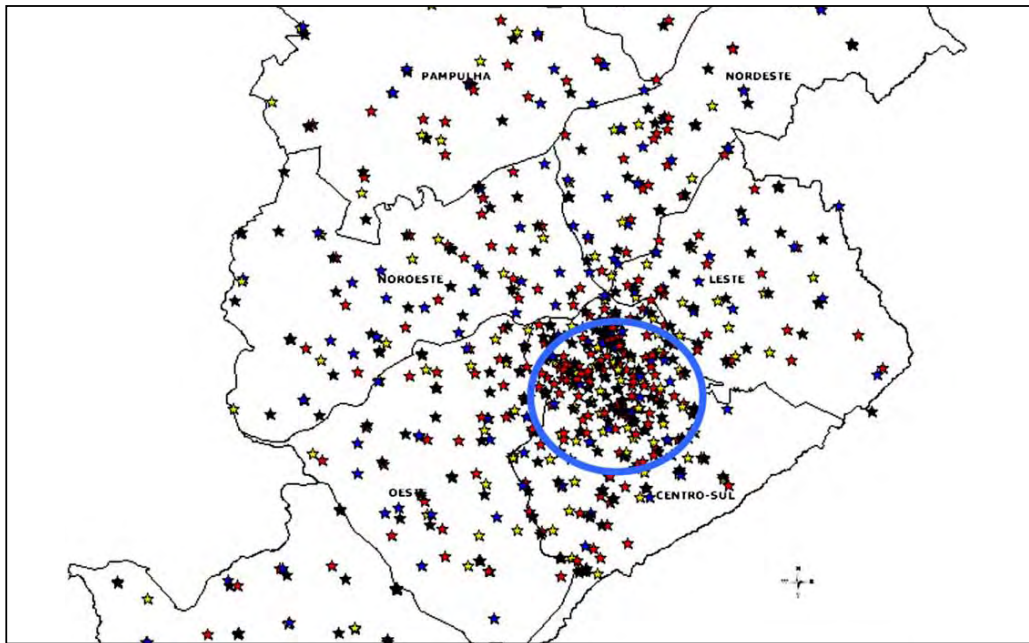
In 2003, the highest recorded power density in the city was $3.06 \mu\text{W}/\text{cm}^2$.

In 2008, the largest recorded power density was $40.78 \mu\text{W}/\text{cm}^2$, 13 times higher than in 2003.

$40 \mu\text{W}/\text{cm}^2$ is 15 times less than the FCC Exposure Guidelines.

Fig. 3. Horizontal and vertical radiation patterns per sector of BS site BH 20

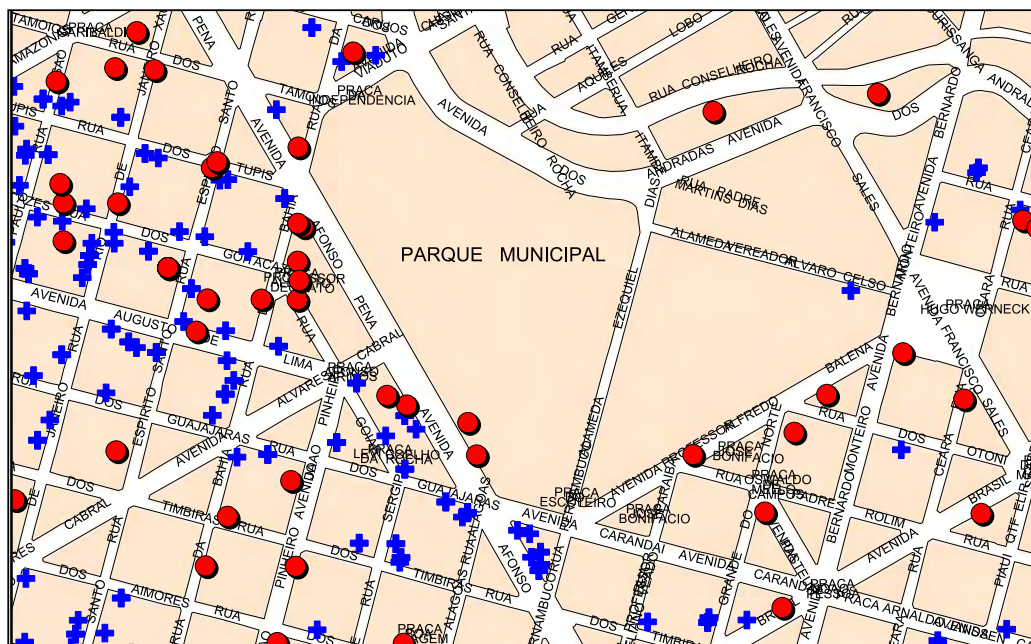
From: Dode AC, Leao MM, Tejo Fde A et al. Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. *Sci Total Environ* (2011); 409(19):3649-3665.



The authors used the Telecommunications National Agency database to map the locations of the 856 cell phone towers that existed in the city as of December 2006.

Fig. 8. Installed BSs in the Belo Horizonte municipality until 2006. Total amount = 856.

Dode AC, Leao MM, Tejo Fde A et al. Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. *Sci Total Environ* (2011); 409(19):3649-3665.



They then cross-referenced health department records of death by neoplasia with census and demographic city population data to **locate the residence** of all individuals who had died of cancer in the city between 1996 and 2006.

Fig. 10. Sample of geocoded deaths and BS locations in downtown Belo Horizonte City located in Central-Southern region.

From: Dode AC, Leao MM, Tejo Fde A et al. Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. *Sci Total Environ* (2011); 409(19):3649-3665.

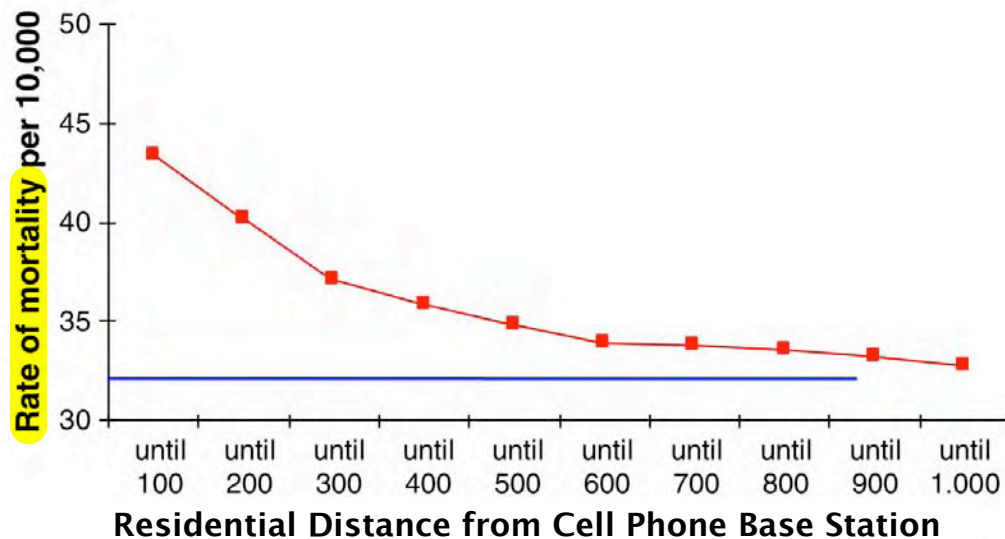
Belo Horizonte, Brazil (2011)



This allowed them to calculate the distance between the deceased individuals' residences and the closest cell phone tower, in meters.

Dode AC, Leao MM, Tejo Fde A et al. Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. *Sci Total Environ* (2011); 409(19):3649-3665.

Belo Horizonte, Brazil (2011)

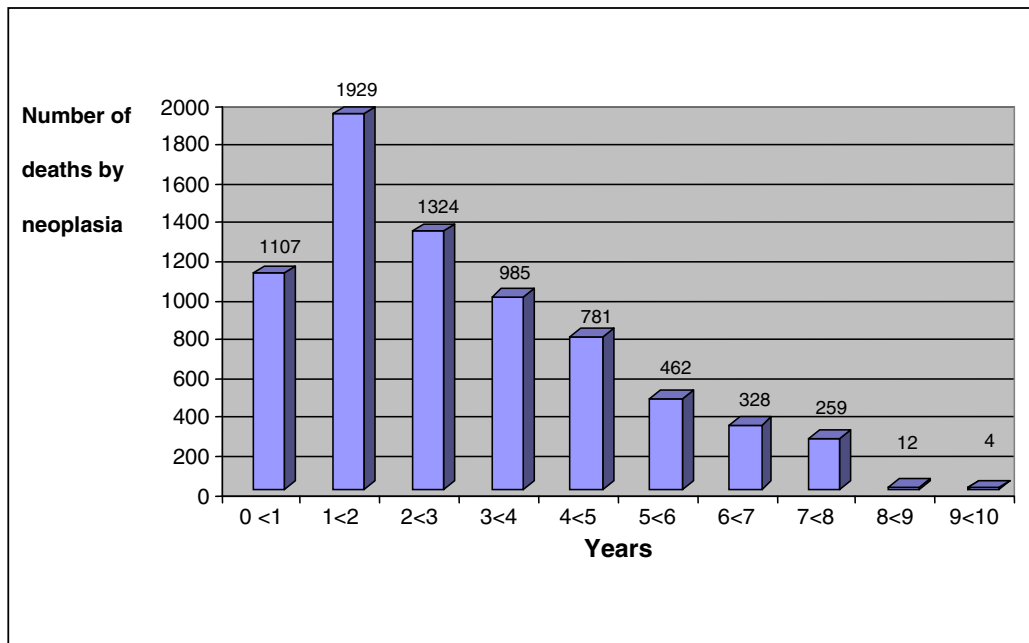


Analysis of this data showed that the cancer death rate was significantly elevated at proximities closer than 500 meters to cell phone towers.

Fig. 15. Rate of mortality by neoplasia, according to the distance from the BS in Belo Horizonte municipality, from 1996 to 2006, and the null hypothesis (blue line).

Dode AC, Leao MM, Tejo Fde A et al. Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. *Sci Total Environ* (2011); 409(19):3649-3665.

Belo Horizonte, Brazil (2011)



Death rates peaked during the second year of exposure.

Fig. 16. Distribution of the number of deaths by neoplasia versus duration of exposure since the date that the first antenna in each analyzed CT came into operation.

Dode AC, Leao MM, Tejo Fde A et al. Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais state, Brazil. *Sci Total Environ* (2011); 409(19):3649-3665.

Effects of Microwave RF Exposure on Fertility

