

Discussion of Radiofrequency Exposure from Proposed Base Station and Review of Health Studies

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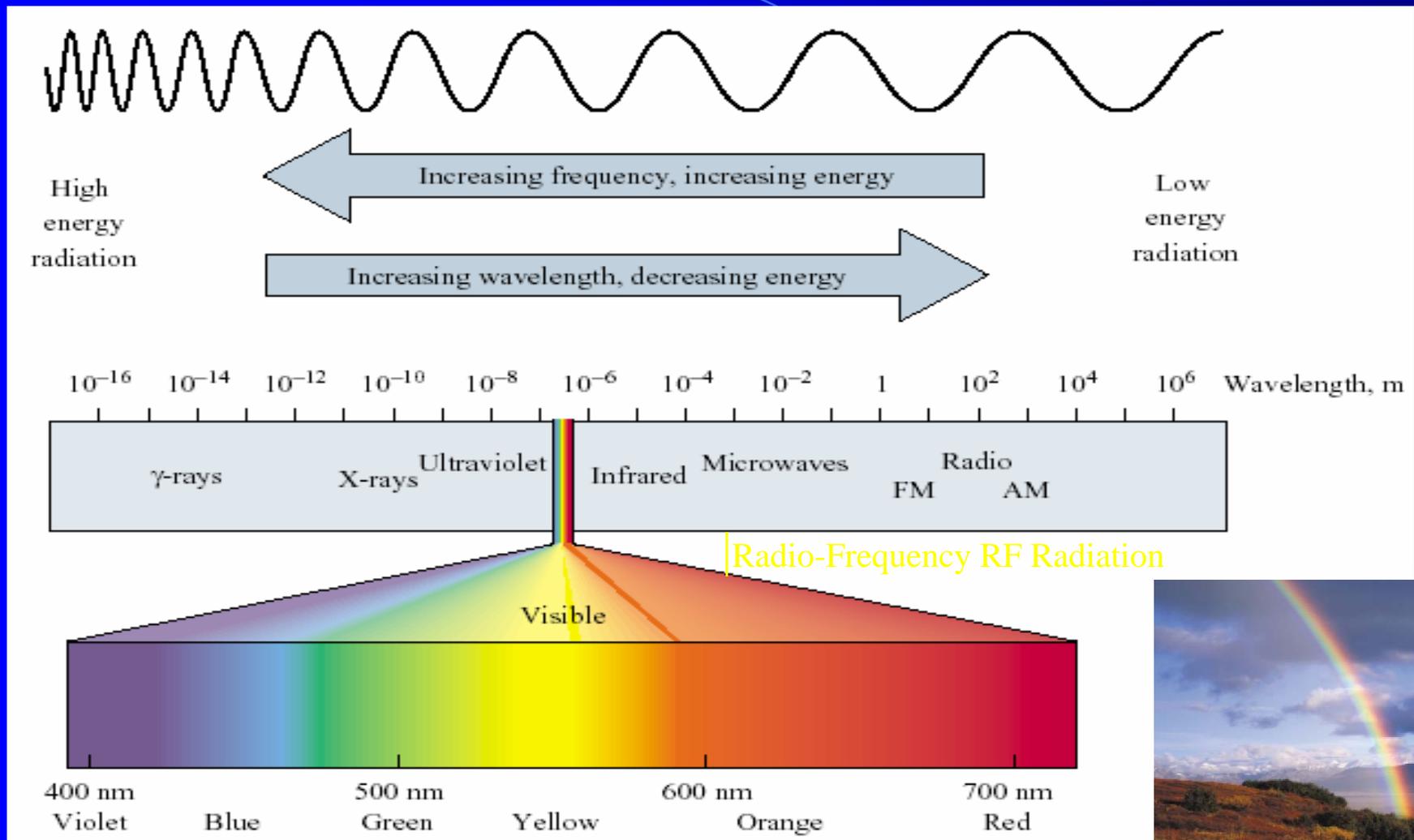
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The Electromagnetic Spectrum

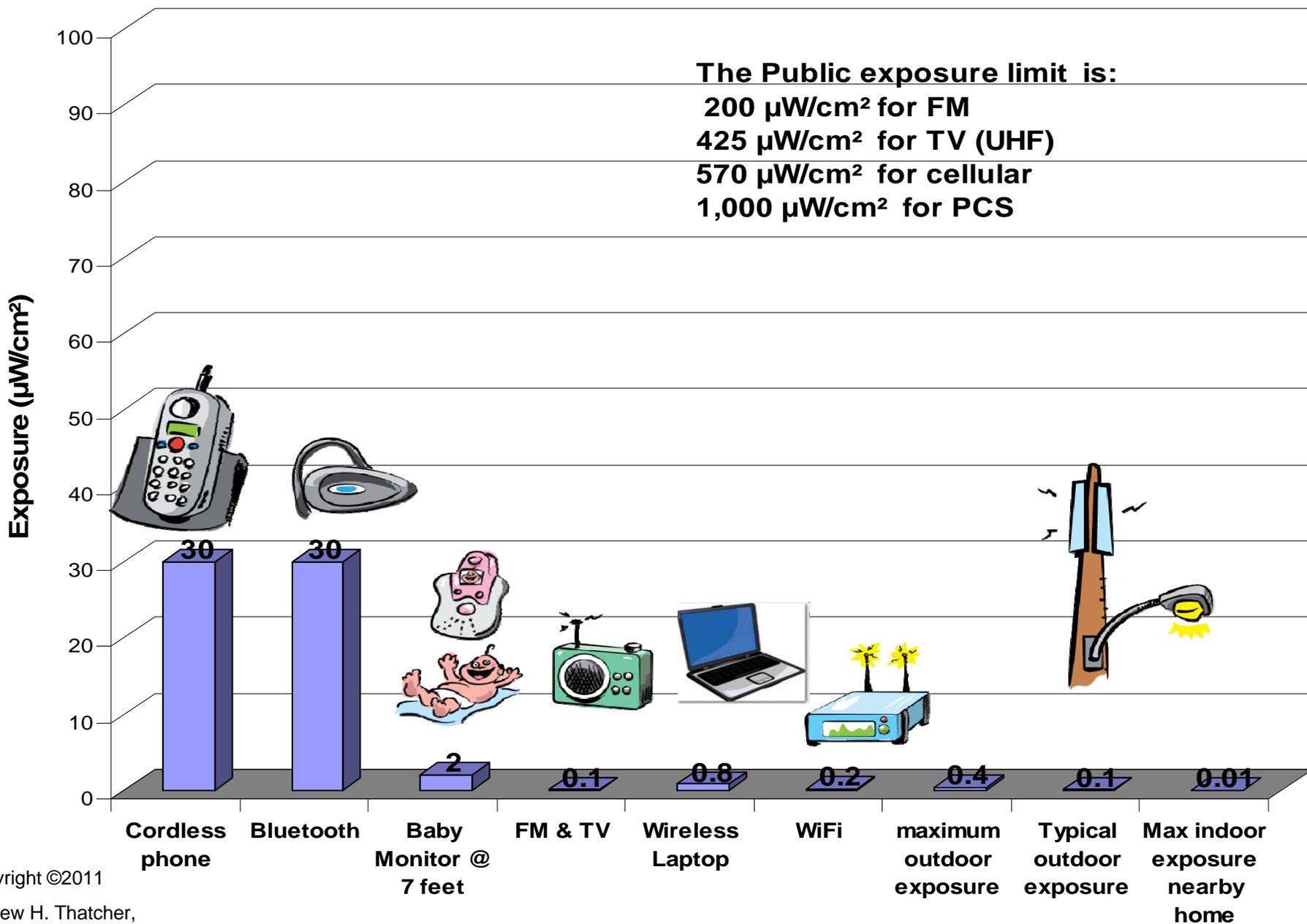


RF Energy is Non-ionizing

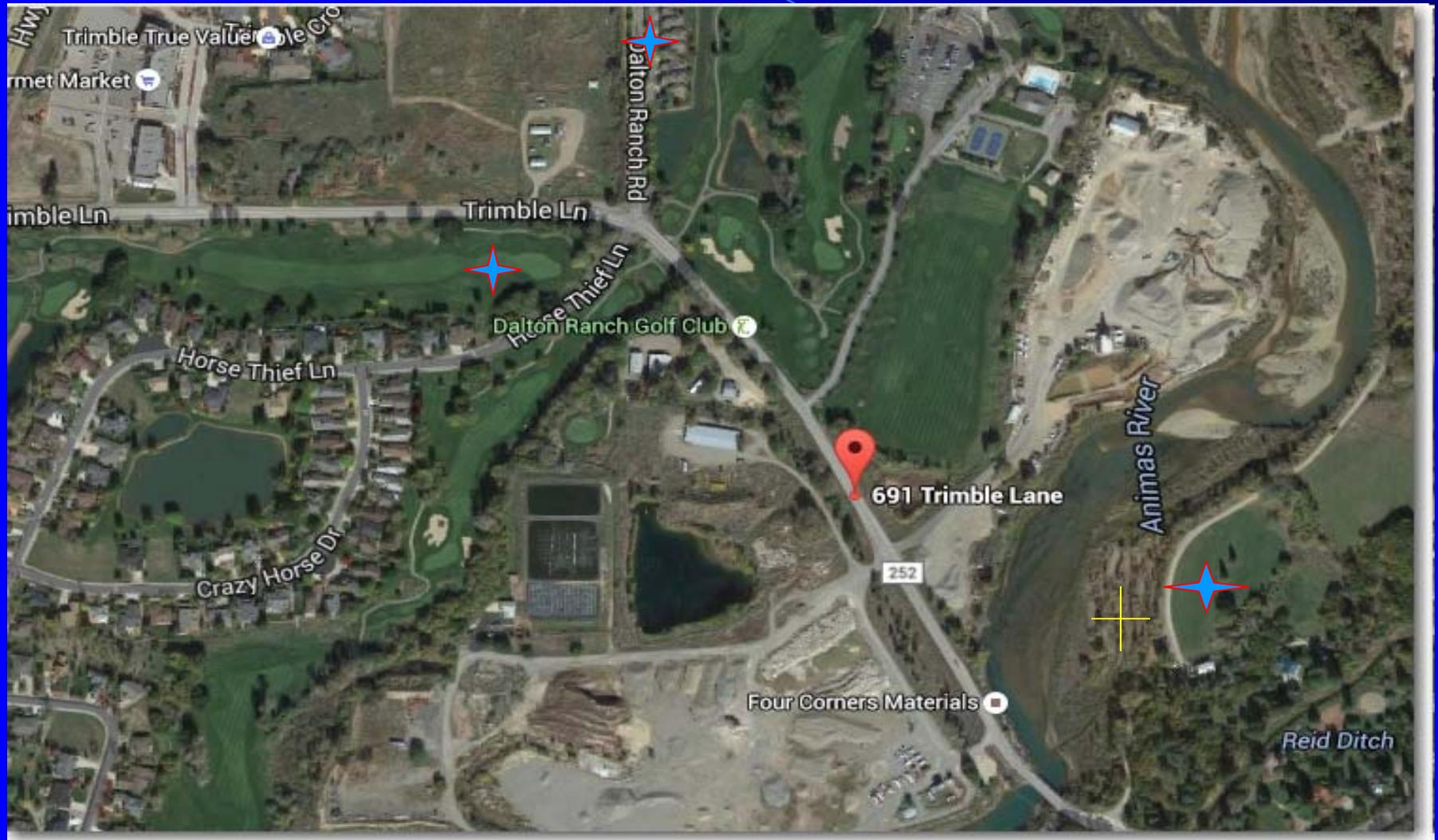
- RF energy such as that used in cellular communication is at least 1 million times too low to directly break chemical bonds or disrupt macromolecules such as DNA.
- With few specialized exceptions, the only confirmed hazards of RF EMF are associated with excessive heating of tissue.

Typical Radiofrequency Exposures in our Lives

The Public exposure limit is:
 200 $\mu\text{W}/\text{cm}^2$ for FM
 425 $\mu\text{W}/\text{cm}^2$ for TV (UHF)
 570 $\mu\text{W}/\text{cm}^2$ for cellular
 1,000 $\mu\text{W}/\text{cm}^2$ for PCS



Calculated Exposure Rates at Nearby Homes range from 0.002 to 0.004 mW/cm², or about 1,400 times less than the public limit



Basis of Standards

- Current standards are designed to provide protection to all age groups, including infants and children, on a continuous basis (24 hours/day, 7 days/week)*
- Basis of standard is to prevent a thermoregulatory response which is at an absorption rate of 4 W/kg. A factor of 50 reduction from this rate serves as the basis for the general public.
- Numerous expert reviews have affirmed the basis of this standard and no other adverse health effects have been identified.

*Direct quote from Health Canada press release March 13, 2015

<http://news.gc.ca/web/article-en.do?nid=949109>

Standards Used in the World

International Commission of Non Ionizing Radiation Protection (ICNIRP) Guidelines (more than 60 countries)

Re-affirmed in 2009

Argentina, Australia, Austria, Brazil, Colombia, Croatia, Czech Republic, Denmark, Ecuador, France, Finland, Germany, Hong Kong, Japan, Hungary, Ireland, Malaysia, Morocco, Netherlands, New Zealand, Norway, Oman, Pakistan, Paraguay, Peru, Philippines, Portugal, Romania, Rwanda, Saudi Arabia, Singapore, Slovak, Slovenia, South Africa, South Korea, Spain, Sweden, Thailand, Taiwan, Tanzania, Turkey, Uganda, UK, Venezuela, etc.

FCC Standard: Bolivia, Canada, Estonia, Panama, USA

Below ICNIRP and IEEE

Belarus, Bulgaria, China, Lithuania, Poland, Russia

Belgium, Chile, Greece, India, Israel, Italy, Liechtenstein, Switzerland

IARC 2011

Radiofrequency Electromagnetic Fields
IARC Monographs, Vol 102

International Agency for Research on Cancer
Lyon, France

Kurt Straif, MD MPH PhD

Head, IARC Monographs Programme

The IARC Working Group concluded that there is

- **limited evidence in humans** for the carcinogenicity of RF-EMF, based on positive associations between glioma and acoustic neuroma and exposure to RF-EMF from wireless phones.
- **limited evidence** in experimental animals for the carcinogenicity of RF-EMF.
- **weak mechanistic evidence** relevant to RF-EMF-induced cancer in humans.

Overall, RF-EMF were classified as “**possibly carcinogenic to humans**” (Group 2B).

International Agency for Research on Cancer



EU Scientific Committee on Emerging and Newly Identified Health Risks 2015

- The results of current scientific research show that there are no evident adverse health effects if exposure remains below the levels recommended by the EU legislation. Overall, the epidemiological studies on radiofrequency EMF exposure do not show an increased risk of brain tumours. Furthermore, they do not indicate an increased risk for other cancers of the head and neck region.
- Previous studies also suggested an association of EMF with an increased risk of Alzheimer's disease. New studies on that subject did not confirm this link.

2012 HPA (UK) "Health Effects from Radiofrequency Electromagnetic Fields. Report of the Independent Advisory Group on Non-ionising Radiation"

"...In summary, although a substantial amount of research has been conducted in this area, **there is no convincing evidence that RF field exposure below guideline levels causes health effects in adults or children.**"

Swedish Council: Ten Year Update (2012)

- We now know much more about measurements and absorption of RF fields and also about sources of exposure to the population and levels of exposure. A considerable number of provocation studies on RF exposure and symptoms have been unable to show any association. Overall, the data on brain tumor and mobile telephony do not support an effect of mobile phone use on tumor risk, in particular when taken together with national cancer trend statistics throughout the world.

2012 Expert Committee appointed by the Norwegian Institute of Health, commissioned by the Ministry of Health and Care Services and the Ministry of Transport and Communications :

"The knowledge base in this health risk assessment provides no reason to assert that adverse health effects will occur from the typical public exposure. This also applies to the use of wireless communications in the office environment."

...

"Exposure from base stations and radio and television transmitters is significantly lower than from using a mobile phone and the available data do not suggest that such low exposure could increase the risk of cancer."

...

"There is negligible uncertainty in the risk assessment associated with other sources, such as base stations, wireless networks, television transmitters and the use of mobile phones by other individuals."

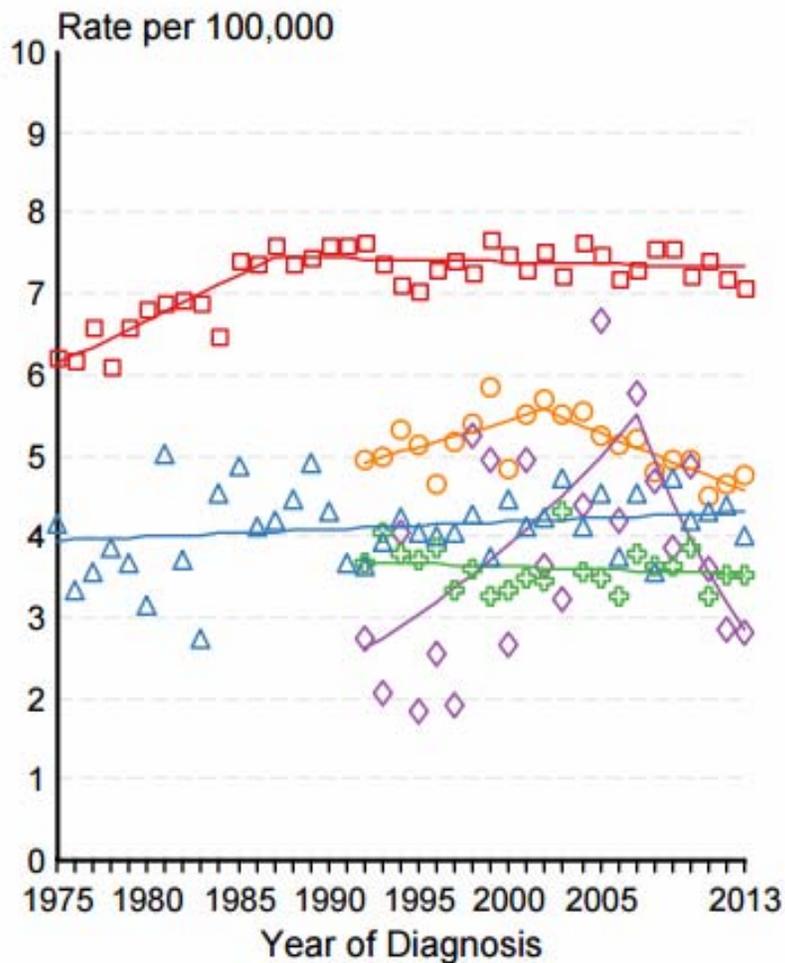
Swedish Summary Regarding Possible Health Risks

- Research on mobile telephony and health started without a biologically or epidemiologically based hypothesis about possible health risks. Instead the inducement was an unspecific concern related to a new and rapidly spreading technology. Extensive research for more than a decade has not detected anything new regarding interaction mechanisms between radiofrequency fields and the human body and has found no evidence for health risks below current exposure guidelines. While absolute certainty can never be achieved, nothing has appeared to suggest that the since long established interaction mechanism of heating would not suffice as basis for health protection.

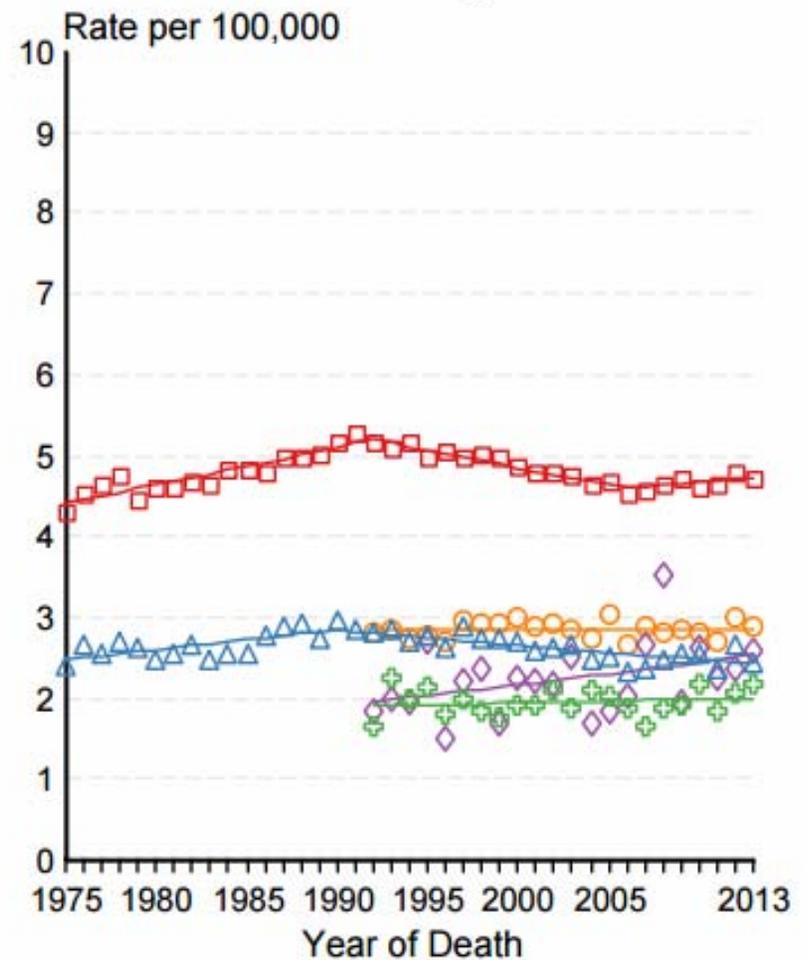
Figure 3.2

SEER Incidence and US Death Rates^a Cancer of the Brain and Other Nervous System, Both Sexes Joinpoint Analyses for Whites and Blacks from 1975-2013 and for Asian/Pacific Islanders, American Indians/Alaska Natives and Hispanics from 1992-2013

Incidence



Mortality



Epidemiology Related to Cell Phone Exposures

- While many large studies have not found evidence to support a link with gliomas, the IARC declaration was based mainly on Interphone study and recent Hardell (Sweden) study which observed modest increases of gliomas and acoustic neuromas.
- Update of Danish cohort study (Frei et al 2011) followed 360,000 cell phone users from 1990-2007. Found no increased risk even for highest users over longest period of time.
- National Cancer Institute (Little et al 2012) compared phone use and glioma risk looking at incidence trends in US. Hardell's elevated risk are not compatible with incidence trends observed but could be consistent with modest risk found in Interphone study.
- Aydin et al 2011 – The first ever study of phone use, children and long term risk. No effects identified.

RFR Exposure and Health Effects Summary

- The proposed site is significantly less than the FCC public exposure limits and complies with all applicable regulations.
- Lack of a plausible Biological Mechanism for health effects
- Epidemiology provides little evidence,
- Animal and cellular study results provide no replicated indication of health effects
- Lack of a Dose/Response relationship
- The exposure from towers to public is too small to result in any effect. No replicated studies have identified any non-thermal effects at these levels nor is there any reason to believe that effects of any type would be observed at these levels

RF Summary

- Radiofrequency exposures have been studied since the early 1950s.
- Current analysis shows that exposures to the relatively new technology is no different than exposures from older FM and TV exposures.
- This area of study is well established – over 25,000 published studies.
- Focus on the major organizational reviews for guidance on possible health effects.

Latest NTP Study on Cell Phones and Rats

- Preliminary results were released but showed that male rats had a higher cancer rate for a few select cancer than the controls.
- Effect not seen in female rats, control male rates had a unusually low survival rate and did not live as long as the exposed male rats.
- The effects were not seen in the male or female mice studies (not released yet)
- Virtually all other animal studies taken together provide no evidence of health effects of RF field exposures

What About People Who Are Sensitive to RF Fields?

- Summary from the Health Council of the Netherlands:
 - From the good quality scientific data emerges the picture that there is no causal relationship between exposure to radiofrequency electromagnetic fields and the occurrence of symptoms. However, there is a relationship between the symptoms and the *assumption* of being exposed and therefore most likely with the risk perception. Nevertheless, the symptoms do exist and require a solution.
- A handout is available that covers this issue as well as Child and Adult Cognition Studies
 - <http://www.gezondheidsraad.nl/sites/default/files/200902.pdf>