



Conducting Epidemiological Studies on Mobile Base Stations

The reliability of epidemiological studies in detecting real associations between illness and environmental factors is limited by, amongst other things, the accuracy and validity of the exposure classification. This is particularly relevant to epidemiological studies testing for associations between illness and radiofrequency (RF) electromagnetic field exposures from mobile base stations. On the current evidence, it appears that it is not feasible to reliably assess individual RF exposures in areas around base stations for epidemiological studies.

Background

There have been several epidemiological studies of residents testing for possible health effects associated with RF exposure from nearby mobile base stations and other fixed radio/TV infrastructure. However, the studies have generally been methodologically poor, lacked adequate exposure assessment and/or have been reliant on subjective measures of health that are prone to bias. The design of future studies should include a consideration of the following.

- *Are the RF exposure in public areas high enough to induce a health hazard?*

Measurements have consistently shown that the RF exposures of residents near base stations range from about 0.002 % to 2 % of the levels recommended in international exposure guidelines. This is well below the established threshold levels for health hazards established from animal and human studies.

- *Do base station signal levels predominate over other environmental RF signals?*

Signal levels from mobile base stations contribute only a minor fraction of the total community RF exposure from all radio services including: AM/FM radio, TV broadcasts, wireless networks, emergency service communications, paging systems, radio communication links, cordless phone systems and so on.

- *Can the signal modulation characteristics activate a biologically resonant response?*

No such resonance mechanism has yet been confirmed despite many studies with various signal and pulse modulations. Moreover, base station signals are typically broad spectrum signals with no regular modulation or pulse pattern.





Variability of RF Signals from Base Stations

At ground level, radio signals from base stations do not reduce uniformly with distance from the antenna. The levels are dependent on many factors including: the height, bearing and type of antennas; radio signal attenuation and scattering due to environmental obstacles such as walls, buildings and trees; and continuous variations in transmitter power due to changing numbers of calls. The growth of data services, such as Internet browsing, will cause further variability in exposures.

Scientific Opinions on Feasibility of Base Station Studies

Attempts to assess individual exposure have used in-home measurements and asking subjects to carry personal monitoring devices, but uncertainties remain high. In 2002, the European scientific group COST281 commented:

“At present there is insufficient basis for performing scientifically sound epidemiological studies of the health impact of mobile telecommunication basestations. Among the reasons are the still unsolved quantitative and qualitative exposure assessment which is complicated by the presence of other RF exposure, the ongoing rapid technological changes and lack of scientific indication for biological study endpoints.”

Neubauer et al in a report for the Swiss authorities concluded:

“Epidemiological studies focusing on base station exposure only cannot be recommended. Rather, all relevant RF sources should be taken into account....At present, methodology for the assessment of long-term exposure from base stations has not been developed.”

The 2007 progress report of the UK *Mobile Telecommunications and Health Research* programme concluded that the scientific justification for base station epidemiological studies was not strong and that it was not yet possible to undertake a well-designed study that could provide a meaningful outcome but research should continue.

Where to go for more information

COST 281 - *Potential Health Implications from Mobile Communication Systems*: <http://www.cost281.org/>

Mobile Telecommunications and Health Research: <http://www.mthr.org.uk/>

Neubauer et al, *Feasibility of future epidemiological studies on possible health effects of mobile phone base stations*, [Bioelectromagnetics](#), 28(3):224-230, March 2007. (12 October 2007)

