

**Provide by Rick Kreutzer, California Department of Public Health**

**On Mar 10, 2011, at 8:51 PM, Kreutzer, Rick (CDPH-DEODC) wrote:**

Dear Lora Lee, Rollin, et.al.:

I've attached and appended below some language about the non-thermal effects of RF EMF and related issues (certainty and exposure pathways) that I hope will be useful.

During our phone conversation, I mentioned Peter Sandman, and I have attached an article by him that may be of interest.

I hope that I have sufficiently clarified my earlier comments, and appreciate the opportunity to be of assistance. Please let us know if you would like to discuss them further.

RK

Dear Lora Lee and Rollin:

I agreed to provide some additional technical assistance and clarification of earlier comments on the section on non-thermal effects in the Smart Meter report. Please note that I have not reviewed all of the literature that the committee reviewed, and that I cannot comment on the conclusions/recommendations of the Report.

***Standards of Proof or Certainty***

Using scientific evidence to shape public policy is always challenging. The standards for declaring certainty within a scientific discipline, which are often based on the results of statistical testing, may be unrealistic or inappropriate for making public policy decisions, particularly those with potential impacts on population health. Statistical tests usually rely on the convention of whether the results of a given study are sufficient to reject the null hypothesis of no effect (i.e., of a given exposure). This is effectively a standard of 95% certainty, analogous to the legal standard of proof "beyond a reasonable doubt."

In public health, we generally consider five factors when reviewing scientific evidence for policy decisions related to specified exposures:

- 1) the severity of potential effect(s): e.g., cancer or serious birth defects would be considered more severe than skin irritation;
- 2) the number of people with potential exposure;
- 3) the levels of likely and possible exposures;
- 4) the degree of certainty of the specific effect(s) at different exposure levels; certainty just above 50% might be characterized as "more likely than not."
- 5) the cost to mitigate potential effect(s), typically considered in light of the other factors. Mitigations may range dramatically in cost; for example, for Smart Meters,

mitigations might include avoiding the source voluntarily, moving the source of exposure, reducing the source emission duration, changing to lower emitting sources, prohibiting installation for certain circumstances, or prohibiting any installation.

Policy makers constantly weigh these factors consciously or unconsciously as they interact with stakeholders to craft good public policy. In one situation, they might consider high-cost mitigations for high-severity effects with high-certainty evidence. In another situation with high-severity effects and “more likely than not” certainty of those effects, they might choose low-cost mitigations.

### ***Non-thermal Effects***

Evidence from studies on non-thermal health effects of RF EMF is confusing. A review of the literature demonstrated inconsistent associations with health outcomes and provided some suggestions of new causal mechanisms for disease. There is legitimate scientific controversy over whether the current body of evidence is best described as “evidence of absence” of health effects or “absence of evidence” of health effects for Smart Meter levels of radio frequency EMF exposures. Few studies have rigorously measured long-term RF exposure or examined potential non-thermal health effects from such exposure. Recently, some studies have suggested that RF absorption from mobile phones may disrupt communication between human cells, which may lead to other negative impacts on human biology. Additionally, some studies of long-term cell phone users suggest an association with brain cancer on the same side of the head that the cell phone was used. Most studies of cell phones and cancer risk do not include many long-term users, and therefore cannot realistically assess potential impacts of long-term RF exposure to the head. “Electromagnetic stress,” which includes symptoms of fatigue, headache and irritability has been reported in less rigorous studies. The strength of this evidence is not such that it would be warranted to say with high certainty that long-term EMF exposure causes significant health effects. However, there is enough suggestive evidence to warrant precaution and further study.

### ***Exposure Pathways***

Of equal importance, is the current dearth of information about potential exposures to Smart Meter emissions. There is no information on the performance of Smart Meters in the field after installation and the amount of variability in their RF emissions. There also is no information on the percent of people who will spend time closer than three feet (for this example the distance is arbitrary but might be more scientifically approximated) to a Smart Meter and the percent of their time within that radius.

The findings on non-thermal effects underscore the need for more research, but they do not prevent policy makers from using the existing evidence, including EMF behavior in general and potential exposure pathways, to create sound public policy, taking into consideration the five factors outlined above.