

December 2, 2014

Arizona Corporation Commission
Docket Control
1200 W. Washington St.
Phoenix, AZ 85007

Docket E-00000C-11-0328 Smart Meters

Comments on the Arizona Department of Health Services report on wireless smart meters

The report *Public Health Evaluation of Radio Frequency Exposure from Electronic Meters*, was entered into this docket on November 4, 2014. It was published by the Arizona Department of Health Service's Office on Environmental Health upon request of this Commission. This document is henceforth referred to as the Report.

The making of the Report

We spoke with Don Herrington, who is the assistant director who oversaw the project, but did not materially contribute to it. He explained that the literature review and the report writing were done by a team of staff toxicologists, who were specialists in risk assessments. No outside specialists were used, except for the field study, which was done by the Arizona Radiation Regulatory Agency (ARRA).

The Arizona Corporation Commission did not pay for the Report. It was done as a courtesy by the ADHS, which used money from a general grant they receive from the federal government. The work was fitted in among the team members' other tasks, and they did not record the number of staff hours.

The Corporation Commission was given an early draft of the report, to see if it covered the questions asked. The Corporation Commission did not have input on the Report's conclusions.

Only associations supporting the report's conclusions are mentioned

The Report relies heavily on the existing radiation standards and the organizations that support them, even though the crux of the smart meter controversy is that these standards are outdated in light of current research.

The main part of the report does not mention that there are government and professional associations with an opposing viewpoint. The American Academy of Environmental Medicine is mentioned in the appendix, but dismissed with a one-line excuse (see next section).

The Report does not mention that the World Health Organization in 2011 classified radiofrequency electromagnetic fields as a Class 2B possible carcinogen — in fact, the Report states the opposite (page 13, IARC entry). Also not mentioned is the Council of Europe Resolution 1815 (issued by a part of the European Parliament), or statements from the International Commission for Electromagnetic Safety and the Austrian Medical Association.

The Report also ignores the various open letters signed by physicians and scientists in this field, such as the Freiburger Appeal and the “Correcting the Gross Misinformation” statement.

We believe all of the above have been entered into the docket, and were directly available to the Report’s authors.

The uninformed reader of the Report is misled to believe that there is no controversy among scientists in the field — that the scientific community is behind the present standards, which is not the case.

Some people may find these omissions justified, since they may believe the Federal Communications Commission (FCC), the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the Institute of Electrical and Electronics Engineers (IEEE) are impartial and worthy of more respect. This stance is mistaken, as shown below.

The FCC’s guidelines for testing how much a cell phone radiates the user assumes the phone is held one inch from the head. The phones are designed to be held directly to the head and that is what the vast majority of people do. The one-inch distance is quite significant that close to a radiant source, so the FCC test method underestimates the true exposure level, and looks like a way for the FCC to circumvent its own radiation exposure limits. This demonstrates that the FCC is not chiefly concerned with the public health.

The present chairman of the FCC, Tom Wheeler, came to his job through the revolving door from being a top lobbyist for the cell phone industry. The FCC has a

very long history of favoring big businesses over ham radio operators, municipalities and individuals.

ICNIRP is not an independent organization (as claimed by the Report), but has close ties to the wireless industry. ICNIRP is secretive about its sources of funding, and membership is by invitation only. One of the central figures in formulating the ICNIRP guidelines, Anders Ahlbom, also owned a business which did lobbying on behalf of the cell phone industry. When this came to light he had to step down as chairman of the World Health Organization's IARC panel, but ICNIRP saw no conflicts of interest. APS' paid consultant, Leeka Kheifets, is also an influential member of ICNIRP.

The IEEE is an engineering organization. One could ask how they are qualified to make health standards. They might not appreciate it if the American Medical Association started making engineering standards.

If the authors of the Report applied the same level of scrutiny to all organizations, and not just to those opposing their viewpoint, then the FCC, ICNIRP and IEEE would be omitted as well.

Opinion by medical association ignored on false premises

On page 35 (in the appendix), the Report mentions three documents that are the most cited by filers in the docket. The Report provides a brief comment on why it refuses to consider each of these documents.

The first entry is a statement from the American Academy of Environmental Medicine, to which the Report comments:

AAEM are [sic] not recognized by the American Board of Medical Specialties.

The AAEM is a professional society of physicians practicing environmental medicine. They actually see the patients who are affected by smart meters and other wireless devices.

We contacted the AAEM and learned that the American Board of Medical Specialties has recognized less than half of the medical societies that exist in the United States, and no new ones since the 1970s. The AAEM has not applied for such a recognition, as it is irrelevant and unavailable.

The AAEM has operated for many years. One of its flagship activities is an annual medical conference. It has conducted 49 such conferences since 1966. Physicians receive Continuing Medical Education credits from attending these conferences, which they use to retain their licenses. The AAEM would not be authorized to issue such credits if it was not a “real” medical association.

The AAEM has issued a more recent statement than the one listed in the Report. Their *Recommendations Regarding Electromagnetic and Radiofrequency Exposure* is from 2012, and includes a paragraph about smart meters. It lists twenty references, none of which appears to have been reviewed for the Report.

The BioInitiative Report is not even mentioned

Several filers in the docket urge the consideration of the BioInitiative Report. This large review document was written by 29 scientists and health professionals from ten countries, including the United States. A particular strength of this work is that all the authors are free of political and monetary influences, which have become a severe problem in this field. And yet, this centerpiece of information is not mentioned anywhere in the Report. This is deeply disturbing.

Questionable logic for omitting an article

A review article by Carpenter, who mentions smart meters in a negative light, is briefly summarized, but then rejected with this statement (page 14):

However, at further study of the article, the article states that a typical electronic meter . . . emits 11 $\mu\text{W}/\text{cm}^2$ of RF radiation . . . which is well below the FCC community guideline

So, the fact that smart meters have health effects at radiation levels below the FCC guideline is a reason to dismiss this article? The whole point *is* that the FCC guidelines are not protective of human health.

Cell tower studies omitted

On page 36, the Report states:

RF exposure at or near cell towers tend to be much higher power densities than that which are measured near electronic meters, and is therefore not within the scope of this report.

This is only correct if very close to the towers. As we point out in our filing in this docket on May 30, 2013 (“What epidemiological studies reveal about health effects from wireless smart meters”), there are several studies showing health effects from cell towers at radiation levels comparable to that of smart meters.

None of these studies have been considered by the Report, nor any of the similar ones we have since found, including the large Belo Horizonte study (“Mortality by neoplasia and cellular telephone base stations in the Belo Horizonte municipality, Minas Gerais, Brazil”, Science of the Total Environment, July 2011).

Studies of cell tower health effects are highly relevant for the smart meter discussion, as both technologies expose people involuntarily to pulsed microwave radiation 24/7, at similar field strengths and frequencies.

Omitting pulsed RF information

On page 36, the Report dismisses the Goldsworthy article with this comment:

This article references RF between 6 Hz and 600 Hz. However, the range of RF is actually 3kHz to 3GHz . . . This review focused on RF and did not research the potential health effects of ELF or IF.

All modern digital wireless communication uses pulsed microwave RF signals. This includes smart meters, cell phones, cell towers, Wi-Fi, etc. The pulses are generated about 6 to 600 times a second, while the pulses themselves consist of RF radiation. Some researchers find that this combination has greater biological effects than continuous-wave RF.

The authors of the Report have clearly not understood the concept of pulsed radiation. Goldsworthy’s article is highly relevant and should not have been omitted.

Existing standards are presented as unquestionable

Throughout the Report, there is a veneration of existing standards. On page 22, we find:

The standards and guidelines are quite conservative, and include safety factors that account for sensitive populations

The reality is that standards and guidelines are often set politically, whether they are about noise levels, inhalants, pollution of drinking water or electromagnetic radiation.

Sometimes the political considerations can even prevent the creation of a standard, as was the case when the EPA tried to create an ergonomic standard.

Health standards operate with the concept of acceptable risk — that some unfortunate people will be affected anyway. When this does happen, the unfortunate people are then told that it is impossible, as the standards were adhered to.

Noise standards have existed much longer than those for electromagnetic radiation, and yet many people are still affected by noise, especially during sleep.

For a comprehensive coverage of the shortcomings of health standards, we recommend the book *Doubt is Their Product*, by David Michaels, who has extensive experience with creating and managing health standards at the federal level. We can also recommend *The Secret War on Cancer*, by Devra Davis, who also has excellent credentials.

The whole point of this discussion is that the present standards rest on outdated assumptions that are not reflective of current science. Simply pointing to standards as sacrosanct is not in the public interest.

The IEEE and ICNIRP standards are based solely on short-term heating effects on lab animals. The Russian standard (40 times lower) is also based on small lab animals, though some possible non-thermal effects were considered there. None of the standards are based on science involving humans, whether in the lab or otherwise.

Regulatory limits always err on the side of permissiveness, not on the side of caution. This means that the population must carry the burden of proof with their health, a proof that must be overwhelming to get a standard changed to reflect the harm, as there are often well-funded special interests opposing any reform. The rosy picture painted by the Report does not reflect reality.

Failure to consider the funding effect

On page 25, the Report states:

. . . when discussing non-thermal adverse health outcomes, the literature is not clear.

The literature becomes much clearer if one considers who paid for it. It is well-documented that studies paid for by special interests also tend to favor those interests in their conclusions. This is a great problem throughout the health sciences, and is

also documented with regard to health effects from electromagnetic radiation, as many studies are funded by the wireless industry. See our filing in this docket on April 29, 2013, which includes an extensive list of relevant literature in its Exhibit C.

The Report dismisses non-thermal effects

Despite omitting the vast majority of the pertinent evidence, the Report states on page 11:

Several studies in the last decade have concluded that RF exposure at lower power densities than those required to cause thermal effects may cause adverse health effects including genotoxicity, decreased sperm count, headaches, sleep problems, concentration problems, and hyperactivity in children.

The Report then continues on to explain it away, by saying the information is based on cell phones and Wi-Fi devices, and that biological changes in humans do not necessarily lead to disease. Any biological effects should be taken seriously and not trivialized.

Just the fact that this form of radiation can cause sleep problems is enough in itself to cause alarm. A lack of restful sleep is a serious stress on the body, which over time can have many consequences.

Other diffuse symptoms, such as headaches and concentration problems, are serious quality of life issues, which also can have severe consequences on a person's salary and chances for promotion.

Dismissing science showing non-thermal health effects from cell phones and Wi-Fi as irrelevant regarding smart meters is a narrow view that does not serve the public health. Any science demonstrating that the current radiation standards are inadequate is relevant, since so many government agencies blindly refer to these standards.

The Report goes on to quote various calls for more studies, and later states that the authors found the science "unconvincing." Many scientists with experience in this field do not share this opinion.

The Report underestimates electrical hypersensitivity

The Report cites (page 4) a WHO report which considers the prevalence of people who are electrically hypersensitive to be just *a few individuals per million*. That is an

extreme underestimate, as most estimates are between 1.5%–5% of the population (Eltiti 2007, Schreier 2005, Levallois 2002, Hillert 2002). There are additional estimates with both higher and lower percentages.

Choosing to quote a prevalence estimate that is a factor of 10,000 lower than the common estimates is trivializing the possible impact, and may make the reader disregard the issue on the false assumption that only a handful of individuals in Arizona can be affected.

Provocation studies on EHS patients

There are presently no objective tests available to diagnose electrical hypersensitivity. This is a common issue for any emerging illness, and not at all specific to EHS. There is very little funding available for the fundamental research that is needed to arrive at objective biomarkers. Allocation of research funding is by nature a contentious process, which is subject to special interests. The industry is naturally not interested in funding such research, and public funding is limited. APS' paid consultant, Leeka Kheifets, has also been active in discouraging public funding of this area (as co-author of an Academy of Sciences report about research priorities, which placed EHS research in the lowest category).

Various provocation studies have been done as they are much cheaper than objective science. In these studies, people with EHS have been exposed to electromagnetic radiation as a single-blind or double-blind test.

The vast majority of these studies have been poorly done, and their results are of little value. A central problem is providing a controlled environment, so the test subjects do not react to other sources, such as computers, lights, wiring, etc. Otherwise it is like asking an asthmatic if they can detect a cigarette in a room filled with cigar smoke. Most of the studies do not adequately control the environment.

In some tests, a specially designed cell phone was used. The “phone” still radiated during the sessions considered as “not exposed” — it was much less, but enough to be picked up by some people with EHS.

Another problem is that many people with EHS have delayed reactions, so the symptoms first show up hours later, or sometimes even the next day.

The difficulty obtaining a good selection of test subjects is illustrated by a Korean study (Kwon 2012) cited by the Report. This study tells us that their group of EHS volunteers used cell phones and other electronics just as much as their non-EHS

controls. People with severe EHS use such devices very little or not at all, so their “EHS group” was not very representative. The people in the control group had a lot of health complaints themselves, with symptoms that are common among people with EHS, thus confusing the issue.

This study also suffered from the usual lack of adequate environmental controls, such as a nearby computer, a USB cable slung across each volunteer, and an ambient ELF radiation level of 0.2 milligauss.

Provocation studies have so many confounding factors that they are not objective science.

As with any emerging illness, acceptance is slow. Europe is leading the world on this issue, with recognition by the Austrian Medical Association being the most recent development.

Power Line Communication (PLC) meters

The Report states that PLC meters *do not communicate via radio frequency* (pg. 2 and 24). This is not correct. What is correct is that PLC meters *currently installed in Arizona* do not use RF frequencies, but newer PLC meters do transmit in the RF range.

Several European countries currently use PLC smart meters communicating with RF frequencies around 70-90 kHz. The California company Maxim Integrated Products announced in 2012 their new G3-PLC system, which also uses RF frequencies (apparently also in the area just below 90 kHz), so RF-PLC may be used in Arizona in the future.

The measurements were done with an unsuitable instrument

The Report includes measurements of the RF radiation from various types of meters. A Tenmar TM-195 instrument was used, which is not a professional instrument and which is not capable of doing these measurements.

We are very familiar with the TM-195 instrument, as we have owned one for some years and have looked into its limitations. According to the manufacturer’s literature, it samples just three times a second — it does not do continuous sampling. This means the instrument will miss the majority of the short, pulsed RF signals from a wireless meter, as these pulses are only about 1/50th of a second in length.

The instrument's averaging function does not provide a true average, as one would expect from a professional meter. It simply provides an average of the discrete thrice-a-second samples.

Since all the microwave energy from a smart meter comes in these short pulses, most of them are not picked up by the TM-195 instrument, and therefore the values recorded will be too low.

Furthermore, the instrument was used to measure inside the smart meters' near field, which stretches out to about three feet from a 900 MHz transmitter. The manual for the TM-195 directly states that it is not designed for near field measurements (section 3.4).

The measurements in the Report are basically worthless and should have been done professionally.

Conclusion

The Report is written by a team of toxicologists who appear to have little prior expertise with regard to electromagnetic radiation, the technologies involved, or the health issues.

Reading the Report, one gets the impression that there is an overall focus on excluding as much material as possible, in order to shore up the existing outdated health standard. The Report provides reasons why some of the important science was ignored, and as we have shown, this rejection seems to have been hasty or ill-informed. We do not know why the rest of the science was rejected, as the Report does not tell us why.

Perhaps the writers of this Report could have benefited from consulting with two scientists in this field — one from each “side” — who each could provide a list of what they consider the most pertinent scientific documentation. The scientists should then have been allowed to respond to the Report writer's reasons for not considering each scientific article.

Even though the Report admits that there are several studies finding health effects at non-thermal levels (i.e. levels below the current standards), it is not willing to accept them. This is not surprising, as it would take a lot of courage for a state health agency to question the current standards. We see this in how the Report venerates the regulatory standards, despite their shortcomings.

History is full of individuals who championed the public health despite a lack of absolute proof and in the face of the prevailing dogma. This includes controlling bacteria in hospitals, controlling epidemics by installing sanitation sewers, stopping the x-raying of fetuses, discouraging smoking, and controlling toxic substances. Regulatory agencies are generally very late at providing standards for protecting the public health, and their standards are often unduly affected by lobbying.

The Report is a disservice to the public health. The authors forget that this is about real human beings and not an academic exercise. There is a lack of balance, and by default it lets any uncertainty benefit the utilities.

The uncertainty should benefit the people of Arizona by allowing anyone to opt out of any digital meters (AMI, AMR, PLC), without being penalized.

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