Review of Health Effects Related to Smart Meters, 7/5/2011

Bruce Cooper, MD MSPH
Medical Director, Health District of Northern Larimer County

Background:

I was asked by Patty Bigner, Customer and Employee Relations Manager of the City of Fort Collins, to help the city interpret information on the potential adverse health effects of the radio-frequency electromagnetic fields emitted by "smart meters" after some concerns were expressed by several residents.

I have focused my review on recent assessments of radiofrequency radiation and health effects conducted by major public health authorities and other government agencies—the World Health Organization, the U.S. Food and Drug Administration (FDA), Federal Communications Commission (FCC) and National Toxicology Program, the University of Ottawa McLaughlin Center for Population Health Risk Assessment in Canada, the Health Protection Agency of the United Kingdom, and the comprehensive 2009 review by the International Commission on Non-Ionizing Radiation. I have also examined technical documents on smart meters published by the Electrical Power Research Institute, and very recent reviews on smart meter health effects produced by the California Council on Science and Technology, April 2011, and State of Maine Center for Disease Control, November, 2010.

Brief Summary of my Findings:

Smart meters are a new technology but they use the same radio frequency (RF) fields as cell phones, cordless phones, WiFi equipment, and other communication devices used around the home. Emissions of RF from these sources are regulated by the Federal Communications Commission (FCC), with advisory support from the Food and Drug Administration (FDA) and Environmental Protection Agency. The RF exposure limits adopted by the FCC were established by the Institute of Electrical and Electronics Engineers (IEEE) with a wide margin of safety, and according to the FDA, are based on detailed and continuously updated assessments of the available scientific evidence. Published research indicates that exposure to RFs from smart meters is very low—1000 times or more below the exposure guidelines established by the FCC.

There is a large body of evidence that has accumulated over the past 20 years examining the potential adverse health effects of exposure to low level RF emissions below the established exposure guidelines, much of it focused on RF from mobile phones. Mobile phone RF exposures are qualitatively similar to smart meters and wireless local area networks, but because typical use of cell phones results in exposures much closer to the body, the resulting exposures are of much higher intensity. Many public health authorities, agencies and expert panels in the US and other countries are periodically reviewing this research and from the documents I have reviewed, they have all concluded that the weight of evidence indicates that there are no adverse health effects from RF emissions below current guidelines. However, all have noted that the published research has limitations, particularly in addressing long-term exposures to low-level RF.

Just a few weeks ago, the World Health Organization's International Agency for Research on Cancer (IARC) announced that they were classifying the electromagnetic fields produced by mobile phones as "possibly carcinogenic". Although this could be seen as a departure from previous assessments, it is important to interpret it in perspective. The classification is consistent with previous reviews that have found no clear scientific evidence of cancer risk, but it acknowledges that the possibility exists based on "limited evidence" of a small increase in risk of a rare form of brain cancer among heavy users of cell phones. According to IARC, the classification indicates that "there could be some risk" and therefore "it is important that additional research be conducted into the long-term, heavy use of mobile phones." (IARC press release, May 31, 2011).

The Federal Drug Administration is the U.S. agency charged with monitoring the research on health effects of EMF. The FDA web site (accessed 7/1/2011) calls attention to the fact that other agents that are currently classified as "possibly carcinogenic to humans" by IARC include coffee, talcum powder and electromagnetic fields around power lines and states, "According to current data, the FDA believes that the weight of scientific evidence does not show an association between radiofrequency from cell phones and adverse health outcomes". Likewise, the World Health Organization's updated fact sheet on mobile phones acknowledges the recent IARC determination, but states, "To date, no adverse health effects have been established as being caused by mobile phone use". While no adverse health effects have been established from exposure to low-level RF, these authorities have echoed those of previous reviews and called for more research to reduce the uncertainty about the impacts of long-term exposure to RF on health, and this research is on-going.

Conclusion

Based on the City of Fort Collins Utilities smart grid implementation plan it appears that residential smart meters and the connecting network to the utility in Fort Collins will contribute a relatively small amount to the total RF emissions from broadcast sources, cell phone base stations, WiFi routers and other devices now in common usage in households and much less than typical use of cell phones. Because of the very low exposure to RFs associated with the planned use of smart meters in Fort Collins, it is not likely to lead to health effects in residents of homes with these devises. There appears to be no health reason to avoid the use of smart meters. Nevertheless, given the uncertainty that still exists regarding the potential long-term health effects of cumulative exposure to RF fields, residents who remain concerned about potential risks may appreciate alternatives to installing smart meters with wireless transmitters.

Limitations

My assessment of the potential health effects of smart meters has several limitations: First, I am not an expert in non-ionizing radiation health effects. I am trained and board certified in public health/general preventive medicine and family medicine. Preventive medicine specialists have core competencies in biostatistics, epidemiology, environmental medicine, and research into causes of disease and injury in population groups. Second, I have not examined the extensive body of literature on this topic, but instead relied on recent summaries of reviews produced by expert panels, agencies and public health authorities we normally rely on to sort out complicated science.