

The Expected Human Risk of Disease Associated with Smart Meters – Summary Report

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Advanced metering infrastructure (AMI) technology to regulate the usage of public utilities has been employed in an increasing number of communities across the United States. One component of this technology, the smart meter, has raised concerns from members of the public about possible adverse health effects derived from exposure to the radiofrequency (RF) emissions of the meters. The City of Madison intends to introduce an AMI system to read water meter data electronically in order to improve the customer billing process and more readily monitor municipal water usage. This system upgrade will undoubtedly lead to similar concerns among some residents of the City of Madison that have been voiced in other communities during the introduction of AMI. Therefore, to address these potential concerns, Public Health Madison and Dane County (PHMDC) conducted a review of the scientific literature and other available informational resources to assess the probability of any human health risk from the operation of smart meters.

The thorough review of the relevant literature suggests that there is little evidence to support any potential association with any adverse health outcome as a result of the installation and operation of the smart meter. This conclusion was based on the following information:

- RF radiation is non-ionizing and lacks the strength to break chemical bonds due to low levels of frequency and longer wavelengths; examples of this type of radiation include radio and sound waves, visible light, and microwaves.
 - ❖ Exposure to high levels of RF radiation has been demonstrated to cause thermal effects which can result in tissue damage and increased body temperature. However, federal standards governing acceptable RF exposure provide an adequate margin of safety to prevent RF-related thermal injury.
 - ❖ Non-thermal effects following exposure including genetic and cellular damage, changes in protein expression, hormonal effects, and cancer have also been suggested but there is no consistent statistically significant evidence to support this proposed association.

- RF radiation is emitted during smart meter communication with the AMI network. These transmissions are normally infrequent and consist of a few milliseconds during each communication; typically ranging from only a few seconds of transmissions during a 24-hour period to, at most, operating a few minutes during the day.
- During transmission, RF emitted from the smart meter is largest at the surface of the meters but decreases substantially with increased distance from the device. All distances evaluated have reported RF levels below federal standards for Maximum Permissible Exposure (MPE) at the meter surface and far below this standard with increasing distance.
- Research specifically evaluating the potential association between smart meters and adverse health outcomes is lacking. However, significant research is available for other similar wireless devices to predict potential outcomes associated with RF exposure derived from smart meters.
 - ❖ Cellular phones are the most researched example of RF emitting wireless devices and have similar frequencies but lower power during operation as the smart meter. Similar to the findings of general RF-related research, there is no consistent statistically significant evidence conclusively linking cellular phone use and human disease.
 - ❖ The lack of evidence supporting non-thermal effects associated with cellular phones no adverse health impacts would be expected from smart meters due to the higher power, closer proximity of exposure, and greater frequency of exposure to RF from cellular phones compared to smart meters.

In summary, the deployment of AMI technology to monitor the use of public utilities has raised some concern due to the emission of RF radiation from the smart meter component of this network. A review of the relevant literature does not support the likelihood of an association between the operation of smart meters and adverse health effects due to the infrequent and low level of RF emissions from the device and the lack of data supporting an association between RF exposure(s) at this level to the development of non-thermal effects in exposed individuals. Therefore, PHMDC supports the deployment of AMI network technology proposed by the City of Madison Water Utility and do not foresee any potential individual and/or community health danger due to the installation and operation of this technology.

Prepared by: Jeffery S. Lafferty, Environmental Health Epidemiologist
 Doug Voegeli, Director of Environmental Health