



[Download this topic \[PDF\]](#)

# Smart Meters

## What are smart meters?

To use (and be billed for) utilities such as electricity, natural gas, or water, the amount you use must be measured. This is generally done with a meter. In the past, the data from the meters had to be read by a person. More recently, meters that automatically send usage information back to the product supplier have been used. These are called smart meters.

Smart meters have been used for a number of years in some developed countries, especially in parts of Europe. In recent years, they have been installed in some areas of the United States as well.

Concerns have been raised about the safety of smart meters, mainly because they give off the same kinds of radiofrequency (RF) waves as cell phones and Wi-Fi devices.

## How do smart meters work?

Smart meters record the amount of the product (electricity, water, etc.) consumed over time. They differ from traditional utility meters in that they are electronic and can talk to a central computer system.

Smart meters talk to their central systems using RF transmissions, based on a cell phone, pager, satellite, radio, power line (PLC), Wi-Fi or Internet (TCP/IP) communication method. Internet and cell phone applications have become the preferred options because of their flexibility and ease of deployment.

## How are people exposed?

Smart meters are typically installed outside the home, either in place of or as part of existing meters. How much RF energy that people are exposed to from the smart meter depends on how far they are from the smart meter antenna and how the smart meter sends its signal. The frequency and power of the RF waves given off by a smart meter are similar to that of a typical cell phone, cordless phone, or residential Wi-Fi router. Smart meters typically send and receive short messages about 1% of the time.

Because the smart meter antenna usually is located outside the home, people are much farther away from the source of RF waves than some other possible sources of exposure to RF radiation, such as personal cell phones and cordless phones. In addition, walls between the person and the smart meter's antenna further reduce the amount of RF energy exposure. This means that the amount of RF radiation that someone would be exposed to from a smart meter is probably much lower than the amount that they would be exposed to from other sources.

## Can smart meters cause cancer?

Smart meters give off RF radiation. RF radiation is low-energy radiation. RF radiation doesn't have enough energy to remove charged particles such as electrons (ionize), and so is called non-ionizing radiation. Non-ionizing radiation has enough energy to move atoms in a molecule around or cause them to vibrate, which can lead to heat but it can't damage DNA directly.

RF radiation is classified by the International Agency for Research on Cancer (IARC), as "possibly carcinogenic to humans." This is based on the finding of a possible link in at least one study between cell phone use and a specific type of brain tumor. Because RF radiation is a possible carcinogen, and smart meters give off RF radiation, it is possible that smart meters could increase cancer risk. Still, it isn't clear what risk, if any there might be from living in a home with a smart meter.

It would be nearly impossible to conduct a study to prove or disprove a link between living in a house with smart meters and cancer because people have so many sources of exposure to RF and the level of exposure from this source is so small. Because, the amount of RF radiation you could be exposed to from a smart meter is much less than what you could be exposed to from a cell phone, it is very unlikely that living in a house with a smart meter increases risk of cancer. The World Health Organization has promised to conduct a formal assessment of the risks from RF exposure but this report is not yet available.

See [\*Microwaves, Radio Waves, and Other Types of Radiofrequency Radiation\*](#) and [\*Cellular Phones\*](#) for more information about the link between RF radiation and cancer risk.

## Do smart meters cause any other health problems?

Smart meters have not been studied to see if they cause health problems. Studies have looked at RF radiation from other sources. Exposure to large amounts of RF radiation, as from accidents involving radar, has resulted in severe burns. No other serious health problems have been reported.

One concern expressed is that the RF waves produced by smart meters might interfere with electronic medical devices such as a heart pacemaker. A study that examined the effect of smart meters on pacemakers and implantable defibrillators found that the smart meters did not interfere with these devices.

### Could smart meters cause health problems in cancer survivors?

While RF exposure might not cause cancer directly, concern has been voiced that cells in the body that have been damaged by exposure to some other substance might somehow be more likely to become cancerous when exposed to RF waves. In theory, this might be a concern for cancer patients being treated with ionizing radiation and/or medicines that might cause cancer themselves. Animal studies have not shown evidence of this and this effect has not been studied in people.

## How can I reduce my exposure to RF radiation from smart meters?

There isn't much you can do to lower your exposure to RF radiation from smart meters. In some places where smart meters are being installed, people have the choice to opt in or opt out of having them, but this isn't an option everywhere.

It may be possible to lower exposure from cell phones and other sources of RF radiation. See [\*Microwaves, Radio Waves, and Other Types of Radiofrequency Radiation\*](#) and [\*Cellular Phones\*](#).

Because the low levels of energy from RF radiation have not been clearly shown to cause problems even at close range, it isn't clear that lowering exposure to RF radiation has health benefits.

## Additional resources

---

In addition to the American Cancer Society, other sources of information include\*:

### Federal Communications Commission (FCC)

Radio Frequency Safety: <http://fcc.gov/oet/rfsafety/rf-faqs.html>

*\*Inclusion on this list does not imply endorsement by the American Cancer Society.*

## References

---

Federal Communications Commission. Radio Frequency Safety FAQs. 6/25/2012. Accessed at <http://transition.fcc.gov/oet/rfsafety/rf-faqs.html> on June 17, 2014.

Federal Communications Commission, Office of Engineering & Technology. Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields. OET Bulletin 56, August, 1999. Accessed at [http://transition.fcc.gov/Bureaus/Engineering\\_Technology/Documents/bulletins/oet56/oet56e4.pdf](http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet56/oet56e4.pdf) on September 19, 2012.

Foster KR, Tell RA. Radiofrequency energy exposure from the Trilliant smart meter. *Health Phys*. 2013 Aug;105(2):177-86.

International Agency for Research on Cancer. IARC Monographs on the Evaluation of Carcinogenic Risks to Humans. Volume 102, part 2: Non-Ionizing Radiation, Radiofrequency Electromagnetic Fields. Accessed at <http://monographs.iarc.fr/ENG/Monographs/vol102/mono102.pdf> on June 17, 2014.

Ostiguy G, Black T, Bluteau LJ, Dupont L, Dyrda K, Girard G, Nguyen DH, Plante M, Thibault B. Smart meters and routers radiofrequency disturbances study with pacemakers and implantable cardiac defibrillators. *Pacing Clin Electrophysiol*. 2013 Nov;36(11):1417-26. Epub 2013 Jul 22.

Tell RA, Kavet R, Mezei G. Characterization of radiofrequency field emissions from smart meters. *J Expo Sci Environ Epidemiol*. 2013 Sep-Oct;23(5):549-53.

Tell RA, Sias GG, Vazquez A, Sahl J, Turman JP, Kavet RI, Mezei G. Radiofrequency fields associated with the Itron smart meter. *Radiat Prot Dosimetry*. 2012 Aug;151(1):17-29. Epub 2012 Jan 10.

World Health Organization. Electromagnetic fields and public health: Mobile phones. Accessed at [www.who.int/mediacentre/factsheets/fs193/en](http://www.who.int/mediacentre/factsheets/fs193/en) on September 19, 2012.

Last Revised: September 24, 2014

American Cancer Society medical information is copyrighted material. For reprint requests, please see our [Content Usage Policy](#).