

In your home

The In your home set of articles is separated into 8 sections, each of which can be individually downloaded. It is a 'work in progress' incorporating new information whenever time permits.

Section 1

Introduction

1. Introduction; powerfrequency (ELF) EMFs; radiofrequency (RF) EMFs; measuring EMFs; the importance of timing
2. Appliances A-C; air conditioners, amateur radio transmitters, amplifiers, electric guitars and keyboards, aquarium, baby monitors, bath hoists, battery operated equipment, battery re-charging mats, beds, blood glucose monitors, bottle warmer, bra, burglar alarm, camcorder, carbon monoxide detectors, CD player, central heating, motor-controlled chairs, clock radio, clothes dryer, coffee grinder, coffee maker
3. Computers; monitors (Visual Display Units or VDUs), wired and optical mice, health effects, parental guidelines, laptop computers, wireless enabled laptop, PDA (Personal digital assistant), computer wireless LAN (local area network), Schools' reactions, parents, broadband, computer games consoles, tablets, computers and Electrical Hypersensitivity (EHS), protection devices against EMFs from computers
4. Cooking; electric ovens and hobs, microwave cooking, barbecues, deep fat fryers
5. Appliances D-H; dehumidifier, dishwasher, doorbell, electric (el) blankets, el can opener, el clock, el drill, el guitar, el kettle, el knife, el lawn mowers, el shavers, el shower, el toothbrush, el vehicles, electricity meter, exercise machine, extractor fan, fan, fax machines, fire alarm, fitness devices, floor polisher, food processor, foot spa, foot & hand warmer, fridge, fridge/freezer, hair curlers/tongs, hair dryers, headphones, hearing aids
6. Appliances H-S; heart pacemakers, heaters, central heating boilers, heating pads, hi-fi, etc., hostess trolleys, immersion heater, iron, Jacuzzi, musical keyboard, lift, loudspeaker, magnetic field therapy mats, meters, mixer & blender, music centre, nightlights, pagers, PDAs, pencil sharpeners, personal alarms, personal radios, pet fences, photocopiers, plasma balls, power tools, printers, projectors, radar, radios, radio transmitters, sandwich maker, sauna, scanner, security systems
7. Appliances S-Z; sewing machines, smoke detector, sockets, solar panel water heating, solar photovoltaic panels, soldering irons, spinners, stairlift, static electricity, sun beds, sun lamp, tea maker, telephone, television, TV and radio transmitters, TENS unit, toaster, toys, transformers, trouser press, tumble drier, typewriters, vacuum cleaners, vagina speakers, washing machines, washer/dryer, waste disposal unit, water filters, water heater, water softener, water supply, wheelchairs, wristwatches

8. Grounding & 92 references

Introduction

There are two primary sources of electromagnetic field (EMF) pollution in the home; house wiring (see 'Your low EMF Home 1. House Wiring'), and electrical appliances.

Here we include some of the electrical appliances found in many homes. Some produce powerfrequency EMFs and some radiofrequency or microwave EMFs (RF). If you are concerned about the electromagnetic fields given off by the appliances in your home, you may want to buy a Pocket Powerfrequency Meter (PPF5), or an Acoustimeter or EMFields Acousticom 2, to measure radiofrequency fields <http://www.emfields-solutions.com/detectors/overview.asp>.

The monitors can also measure the low frequency electromagnetic fields generated by car electronics, physiotherapy equipment and LCD monitors which may be a cause of oxidative stress in the human body and may lead to free radical diseases (Lewicka [2015](#)).

Powerfrequency (ELF) EMFs

Most of the research that has investigated the effects of EMFs on human health have looked at the level of EMFs rather than particular appliances, though there have been one or two exceptions. Leitgeb's ([2008](#)) study concludes "*Exposure to magnetic fields of electric appliances are not negligible in daily life. Many devices (more than 1000 tested) exceeded permitted reference levels.*"

A doubling of childhood leukaemia has been associated with magnetic field levels above 0.4 microtesla (μT). Research in other countries suggested the association was at the lower level of 0.3 μT . Other forms of cancer, clinical depression, even suicide, miscarriage, Alzheimer's disease and immune system problems, as well as adverse interactions with prescribed drugs have been associated with low levels of magnetic field exposure.

Magnetic field levels in the average UK house should ideally be no higher than 0.04 to 0.05 μT , though they may be higher in terraced houses and multi-occupancy buildings.

Electric field exposure has not been studied as much, because a) it is harder to measure, and also b) is reduced by most building materials if it comes from a source outside the house. There is evidence that if it is experienced together with high magnetic fields it will greatly increase your risk of developing a serious illness. Ideally, electric fields in the house should be no higher than 15 volts per metre.

Generally, any appliance which only has a two wire mains lead (i.e. Neutral [blue] & Line [brown]) and no 'Earth' connection [grey] will almost always give off high electric fields. This applies to many lamps. For instructions as to how to earth such an appliance, see Section 8. Grounding and references.

Most appliances which give you the option of running them from mains power or battery power only have two-wire connections, and also usually contain a cheap transformer which 'leaks' high levels of magnetic fields even when the appliance's own switch is off. *Such appliances need to be switched off at the wall, or unplugged, to remove the fields.*

Radiofrequency (RF) EMFs

Global exposures to RF as a result of emerging wireless technologies, including mobile phones, cordless phones, DECT phones, WI-FI, WLAN, WiMAX, wireless internet, baby monitors, and other pieces of equipment being used everyday may present serious public health consequences, according to Sage & Carpenter (2009). Regardless of whether or not the associations are causal, they are sufficiently strong in the opinion of the authors, that taking action to reduce exposure is imperative, especially for the foetus and children.

Cancer, extreme lethargy, headaches, epilepsy, sleep disturbances, blood pressure and heart rate changes, behavioural changes, irritability, concentration and memory problems are linked to RF or microwave exposure.

The smart-home

Smart-home technology allows people to control household appliances via their mobile phone or other wireless gadgets. It uses a monitor to allow heating, air conditioning, lighting, and other things to be controlled. It requires all the appliances in the home to be networked together, with the monitor between the appliances and the controller, such as a mobile phone.

This is hoped to be help people with special needs such as those with Alzheimer's disease, those who are blind or partially sighted, and young people with cognitive impairments.

However, it will expose all home occupants to higher RF exposure.

Measuring the EMFs from appliances

We discuss the appliances with respect to the level of EMFs, powerfrequency or radiofrequency, that they will expose the user to, in this context.

The electromagnetic fields that appliances give off vary greatly from one make and model to another. The *only* sure way of knowing is to obtain a meter, such as the [EMFields ELF meter](#) or [MagneMeter](#) for powerfrequency fields and the [Acoustimeter](#) or [Acousticom 2](#) for radiofrequency (microwave) fields and measure them. In our opinion it is wise to minimise all exposure to EMFs.

Public Health England and other advisory bodies, and some researchers have used what is called a "time-weighted average" (TWA) to assess the amount of radiation you are exposed to because of a particular piece of equipment. They obtain this by calculating the fields given off by the piece of equipment, and the amount of time you use it and then average this over 24 hours. Although this sounds like a reasonable idea in theory, in practice the body does not average out what it is exposed to over a certain period of time. It reacts to whatever level of exposure is *actually* there during critical periods. The body is **very** sensitive to *changes* in field levels not to averaged levels.

Timing of exposure

The evidence does not make it clear whether long-term low-level chronic exposure is worse than short periods of high exposure. However, it seems that you are more likely to experience adverse health effects if you are sitting or lying still in higher than normal fields for extended periods of time, or if the fields change rapidly in a short period of time. Scientific evidence about the body's production of the hormone melatonin (mainly at night, with its protective effect on our health), suggests that it is unwise to have high exposure, even for short periods, in the evening, or during the night, as melatonin production is reduced when you are exposed to EMFs.

We believe that electrical appliance use in the kitchen and elsewhere in the evening should be minimised - especially if you are standing closer than a metre away from the source. Night time exposure, when you are in bed, should be minimised as the top priority. We believe that this is the time when EMF effects are likely to be strongest when you are asleep and your body is repairing itself.

A survey reported in February 2010, showed that children are missing out on sleep because of televisions, mobile phones and computers in their bedrooms. It is recommended that 10-year-old children get at least 10 hours of sleep a night; half of children aged 9 to 11 are being kept awake by electric and electronic gadgetry. Health experts have linked a lack of sleep to problems with concentration, behaviour and schoolwork. Children who don't get enough sleep have less energy and can be irritable or behave badly. A study by Pesonen ([2010](#)) suggested a good night's sleep could reduce hyperactivity and bad behaviour among children.