

Electromagnetic fields: High-level microwave technology concerns

Andrew Michrowski, Ph.D.

The Planetary Association for Clean Energy, Inc

100 Bronson Avenue, Suite 1001 OTTAWA, Ontario K1R 6G8 (613) 236-6265; fax: (613) 235-5876
pacenet@canada.com <http://pacenet.homestead.com>

It is not generally appreciated that the advanced nature of wireless gadgets being currently marketed is founded on devices that have been around since the 1940s. They are based on prior commercial and military devices in aeronautics, citizen band, microwave ovens, public safety communications, radar, radiosondes, radio astronomy, television, walkie-talkies, since the mid 1950s – so, for over a half century, or 2 generations.

Precise, quality, straight-forward medical and scientific research since 1950s details radiofrequency and microwave effects – without influence of stocks, PR and lawyers. By 1970s, electromagnetic, electrochemical, cascade effect equations were well defined for tissues, cells, intracellular & extracellular fluids and macromolecular effects on living systems and for materials corrosion. Research explains magneto-mechanical and electromechanical processes, field forces on charged particles (Lorentz force), orientation effects, pearl chain formation, etc. Analysis of 1950-1974 mortality of 40,000 Korean War veterans shows that microwave exposure effect is cumulative; it affects all deaths, especially accidental and respiratory; doubling to tripling cancers of eye, brain and central nervous system, lymphatic and hematopoietic and digestive system. This means that even “weak” and short exposures from wireless systems accumulate over the years and decades to engender serious diseases.

Academic treatises on subject were developed by Russians in 1960. Canadians and Americans (including **A. Szent-Gyorgyi** followed suite a decade later), looking at weak interactions in living systems. What became basis of exposure standards in Canada in early 1970s - contemplated only for workers - were at first applied only for 6-minute exposure times – and now are incorporated in Canada for 24-hour, pulsed or continuous wave, exposure for the entire public, including pregnant women, children, seniors and patients in hospitals.

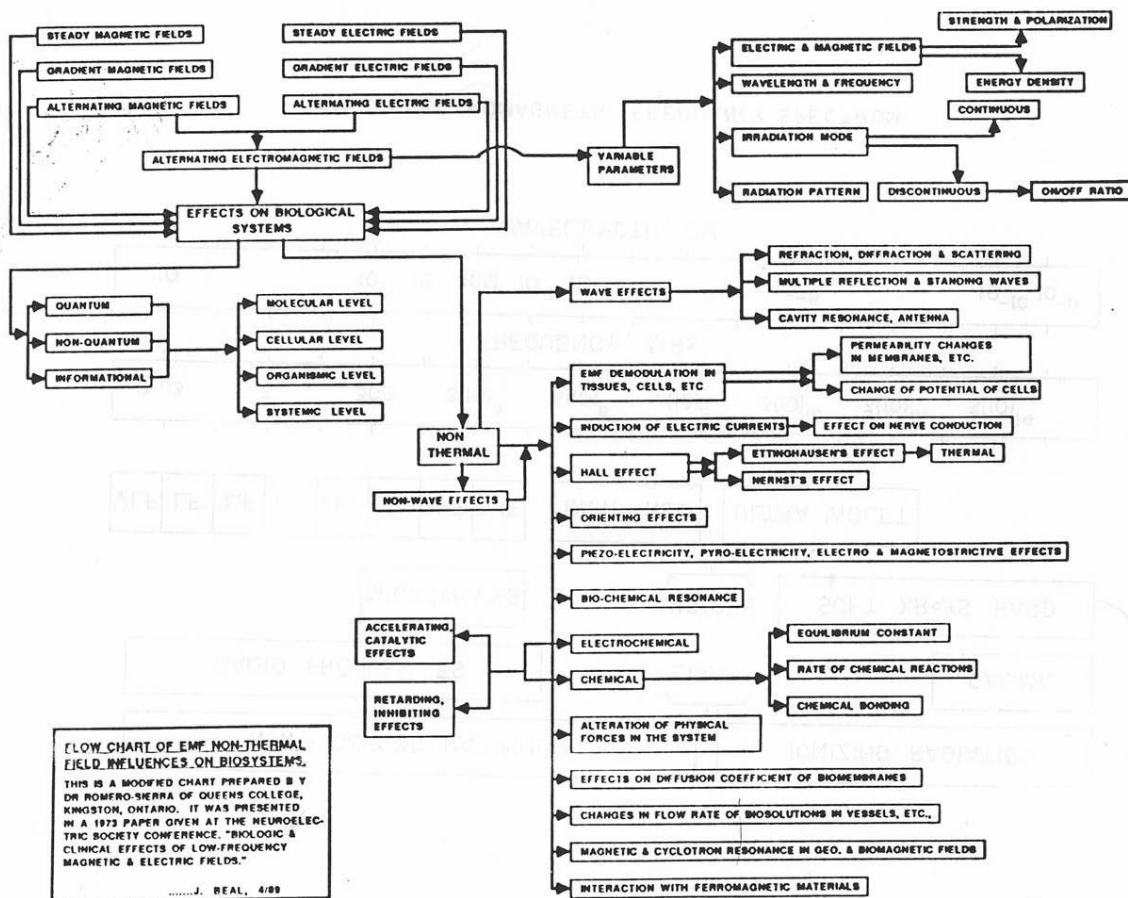
More and more these **Safety Code 6** standards are not upheld nor respected by the standard-setting authorities, such as **Health Canada** and **Industry Canada**. Below is a flow chart prepared the **National Research Council of Canada Control Systems Laboratory** in 1973 indicating 22 non-thermal (non-heating on tissue) effects documented and generally understood by the scientific community more than 30 years ago.

Now, scientists daring to describe a part of such phenomena risk their career and income.

What is new is that the exposure phenomenon of biological effects is now much more intensified – several trillion fold - at the individual-user level at close range, at environmental exposure of “second-hand” exposure. We begin to observe on a large scale in urban centres particularly pursuant to secondary and further effects caused by large-scale modifications of human society, animals and in plant make-up.

The **Magras Xenos** 1997 study indicated that at environmental wireless exposure levels (0.168 $\mu\text{W}/\text{cm}^2$ to 1.053 $\mu\text{W}/\text{cm}^2$) lower than those now commonplace outdoors in Metro Toronto, Hamilton, Mississauga, mice become infertile between third and fifth generations. A 2009 study on the woofer wireless technology (50 – 100 GHz) by Indian scientists **K. K. Kesari** and **J. Behari** shows the same tendency for affecting fertility via DNA modification. In 2008, over 10,000 Royal Norwegian Navy employees observed less fertility and sex ratio effects associated with wireless technology exposure. A 2009 Chinese military study by **S. Xu** shows that typical adult digital cellphone 1-day exposure level causes oxidative damage to *mitochondrial* DNA (*mtDNA*) in the brain's cortical neurons – accounting for various nervous system diseases.

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National Research Council of Canada: LTR-CS-98 – **Environmental pollution by microwave radiation – a potential threat to human health**, prepared by Dr. J. A. Tanner, Control Systems Laboratory at NRC and Drs. J. Bigu dell Blanco, C. Romero-Sierra, Queen’s University, April 1973.

How do the health statistics follow the onset of new wireless technologies? One has the first instance of introduction into an environment. The mortality rates of U.S. cities jumped from their usual levels as recorded for decades prior to the introduction of the analog cell-phone systems in 1996 – 1998. The mortality increase appears to be a function of the type of building skyline, geography, humidity of soil (plain, hills, and valley formation) whereby emissions would be shielded by structures and vegetation.

| Selected United States cities | | | | |
|-------------------------------|--------------|---------------------------------|--------------------|----------------------|
| city | PCS service | start date | mortality increase | duration of increase |
| San Diego | Pacific Bell | 11/96 | 15% | 4 weeks |
| Los Angeles | Pacific Bell | 7/97 | 27% | 4 weeks |
| New York | Omnipoint | 11/96 | 10% | 11 weeks |
| Chicago | Primeco | 12/97 | 11% | 10 weeks |
| Boston | Sprint | 10/97 <i>partial service</i> 5% | | |
| Boston | Sprint | 1/98 <i>full service</i> | 20% | 9 weeks |
| Portland | Sprint | 2/98 | 16% | 12 weeks |

Estimated deaths:10,000 Data sources: *Center for Disease Control, Atlanta, Research: Arthur Firstenberg*

Progression of symptoms in an environmentally hypersensitive individual pursuant to a city-wide PCS network going "on-line"

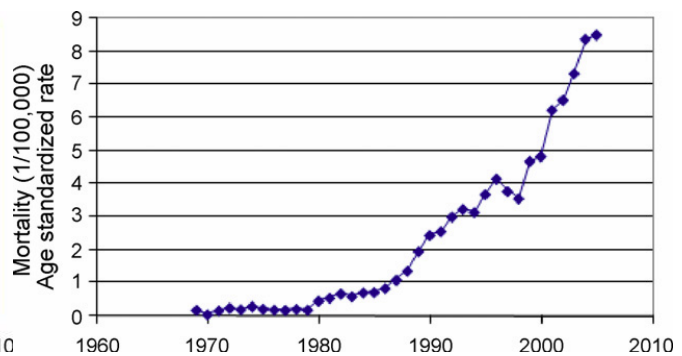
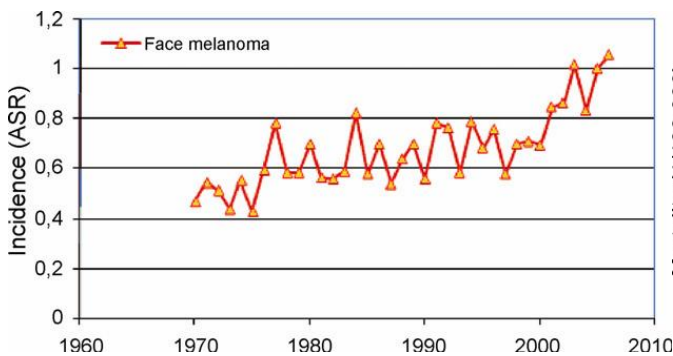
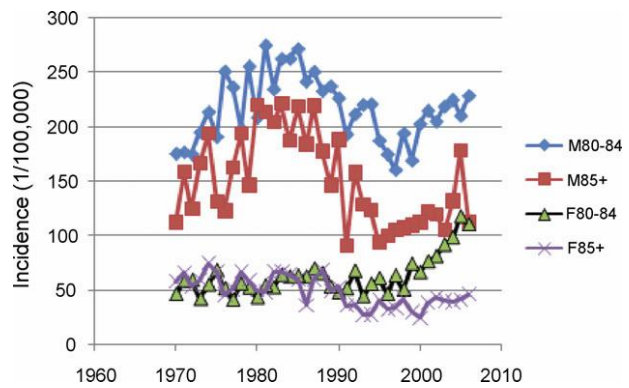
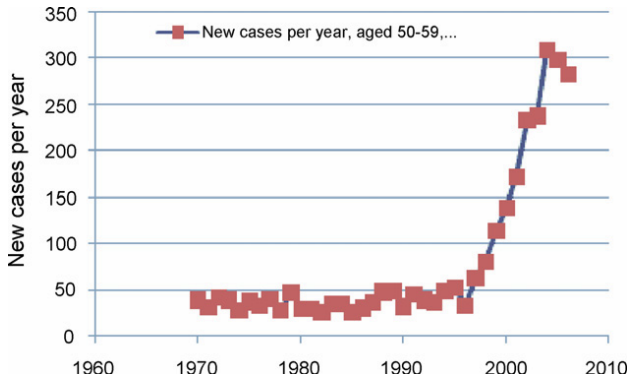
| Day | Symptom | Notes |
|-----|--|-----------------------|
| 1 | dizziness | |
| 2 | insomnia, nausea | incremental with time |
| 3-7 | eyes protruding from head, dry, puffing lips | incremental with time |
| | thyroid filling up, burning sensation, mid thorax | " " " |
| | motional pain in body, 1 st asthma symptoms in life | " " " |
| | trembling, pain in soles of feet | " " " |

symptoms disappear in tunnels and caves and leaving PCS-service zone

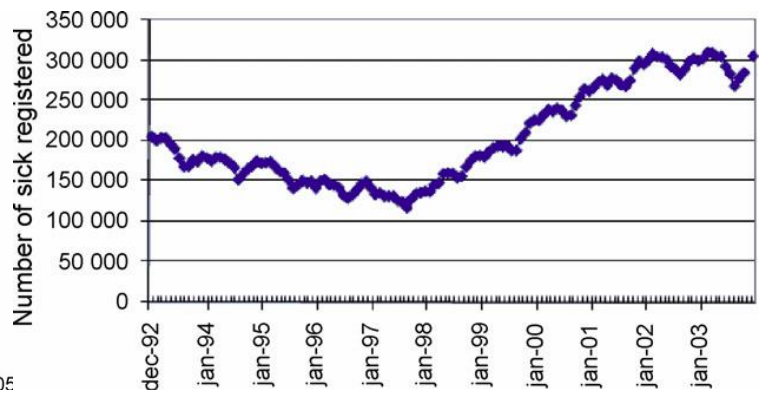
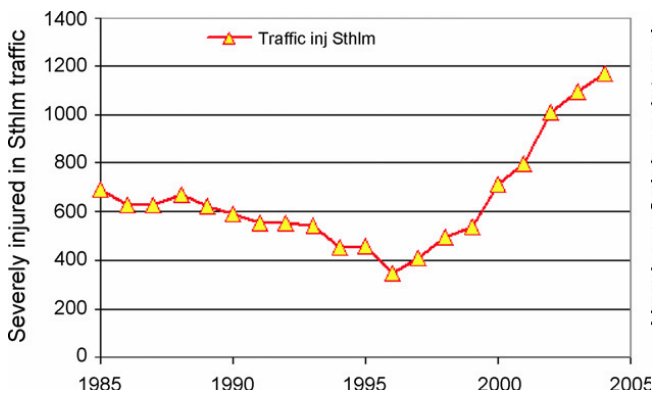
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Health indicators can be followed with national and metropolitan region health statistics that follow the curve of wireless technology consumption. Such is the case of Sweden, followed by **Karolinska Institute**.

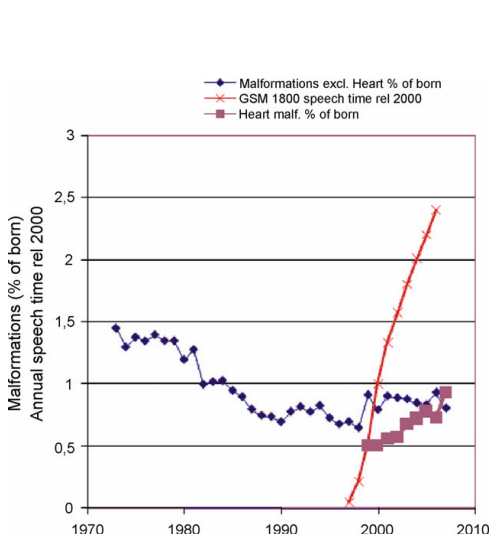
Swedish health indicators: introduction of wireless technology: New cases of prostate cancer: men aged 50–59, Stockholm County; Lung cancer in elderly (male (M) and female (F)); Facial Melanoma among people <60 years since; Alzheimer’s mortality. From: **Apparent decreases in Swedish public health indicators after 1997** Örjan Hallberg, Olle Johansson, *Neuroscience, Karolinska Institute, 2008*



Other indicators are: Traffic injuries in Stockholm; Number of people registered as sick suddenly



Finally: percentage of newborns with heart problems - also shown is annual speech time in dual band cellphones relative to year 2000 - trend of malformed newborns excluding heart problems



Weight of evidence

All studies listed below have found adverse health effects from microwaves at levels similar to those emitted by Wi-Fi equipment:
Santini et al, 2002: 530 people living near mobile phone masts reported more symptoms of headache, sleep disturbance, discomfort, irritability, depression, memory loss and concentration problems the closer they lived to the mast.
Oberfeld et al, 2004: 97 people living near mobile phone masts reported more symptoms of fatigue, irritability, headaches, nausea, loss of memory, visual disorder, dizziness and cardiovascular problems the higher their level of microwave exposure.
Eger et al, 2004: A three-fold increase in the incidence of malignant tumours was found after five years' exposure in people living 400 metres from a mobile phone mast.
Wolf & Wolf, 2004: A four-fold increase in the incidence of cancer among residents living near a mobile phone mast for between

three and seven years was detected.

REFLEX, 2004: A four-year study on human cells found that, after exposure to low-power microwaves, they showed signs of DNA damage and mutations that were passed on to the next generation.
Abdel-Rassoul, 2007: Residents living beneath and opposite a long-established mobile phone mast in Egypt reported significantly higher occurrences of headaches, memory changes, dizziness, tremors, depressive symptoms and sleep disturbance than a control group.
Bortkiewicz et al, 2004: Residents close to mobile phone masts reported more incidences of circulatory problems, sleep disturbances, irritability, depression, blurred vision and concentration difficulties the nearer they lived to the mast.
Hutter et al, 2006: 365 people living near mobile phone masts reported higher incidences of headaches the closer they lived to the masts.

Stewart report, 2000: Research conducted by HPA chief William Stewart advised the main beam of a mobile phone mast should not be allowed to fall on any part of a school's grounds.
Hecht & Balzer, 1997: A huge review of studies concluded a vast array of health effects, including insomnia, brainwave changes, cardiovascular problems and increased susceptibility to infections.
Carpenter & Sage, 2007: Concluded that an maximum outdoor exposure limit of 0.6 V/m should be set, and that Wi-Fi systems should be replaced with wired alternatives.
ECOLOG-Institut, 2000: Found evidence for increases in immune and central nervous system damage, and reduced cognitive function. Recommended an exposure limit 1,000 times lower than current guidelines.
Kolodynski & Kolodynska, 1999: School children living near a radio location station in Latvia suffered reduced motor function, memory and attention spans.

What are the symptoms of exposure to electromagnetic fields, especially among the hypersensitive?

SYMPTOMS RELATED TO EMF EXPOSURE

100 patients double-blind study

- Neurological:** tingling, sleepiness, headaches, dizziness, loss of consciousness
- Musculoskeletal:** pain, spasms, vibration
- Respiratory:** pressure in ears, tooth pain, tightness in chest, shortness of breath
- Cardiovascular:** palpitation, flushing, tachycardia, edema
- Gastrointestinal:** belching, nausea
- Ocular:** burning
- Dermal:** itching, burning, prickly pain

Significance: effects in response to blind exposure.

Rea, W., et al. **Electromagnetic field sensitivity.** *Journal of Bioelectricity.* Volume 10. 1991. p. 241-56.

Reported subjective symptoms (from office equipment, fluorescent lights, household appliances, television and cellualars)

Nausea, headache, rash and jitteriness are among the first symptoms to appear.

Symptoms from the nervous system, sex organs, upper respiratory tract and gastrointestinal tract, and include: headaches, dizziness, heart palpitations, profuse sweating, depression & memory difficulties. Nervous system symptoms generally persist longer than skin symptoms.

Knave, Bent, et al, various reports: 1989 and 1994. Also: Bergqvist U. & E. Vogel, 1997; Liden, S.,1996; Wahlberg, J. E. 1994, Sandström, M. 1997.

Uncontrolled provocation study

Two patients sat in front of a television set. Analysis of skin biopsy samples revealed total disappearance of *somatostatin*-positive cells after 3 hours of exposure.

Johansson, O., M. Hilliges, V. Bjornhagen and K. Hall. **Skin changes in patients claiming to suffer from "screen dermatitis": a two-case open-field provocation study.** *Experimental Dermatology.* Volume 3. 1994. p. 234-8.

Skin rash case-control study

163 VDT-exposed workers: increased odds ratio (3.0) for symptoms in people who with a 50Hz background electric field > 31V/m in comparison with workers in rooms with < 10 V/m. After adjustment for confounding factors (work duration, psychosocial climate and job stress), odds ratio increased to 4.0. Odds ratio was even higher when only females were considered in the analysis (6.6).

Sandström, M., K. H. Mild, B. Stenberg and S. Wall. **Skin symptoms among VDT workers and electro-magnetic fields - a case reference study.** *Indoor Air.* Volume 5. 1997. p. 29-37. Sandström, M., E. Lyskov, E. Berglund, S. Medvedev and K. Mild. **Neurophysiological effects of flickering light in patients with perceived electrical hypersensitivity.** *JOEM.* Volume 39. 1997. p. 15-22.

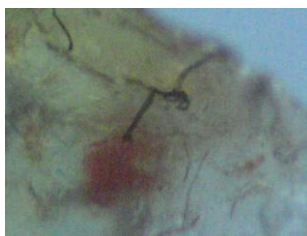
Typical exposure of male rats exposed for 4h daily, 7 days a week for 1 month to power-frequency fields. Significantly increased number of serotonin-positive *mast* cells in the skin (p<0.05) and NPY-containing nerve fibres in the thyroid

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($p < 0.01$) of rats exposed to ELF-EMF was found compared to controls, indicating a direct EMF effect on skin and thyroid vasculature has been reported by **Olle Johansson**, Karolinska Institute. In 2009, Danish scientist **Fredrik Soderqvist** found that people who talk often on cell phones have a higher concentration of the *transtyretin* protein than those who do not. *Transtyretin* is formed in the liver; it helps transport vitamin A in the body and plays an important role in nervous diseases such as Alzheimers.

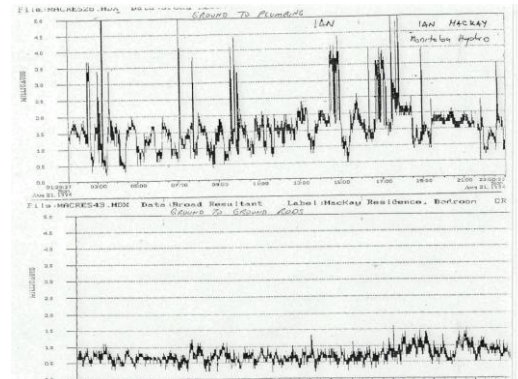
The symptoms of *Morgellons* disease include those of electromagnetic hypersensitivity (EHS); may be based on how body uses electric currents to repair wounds to the skin. Persons who suffer from this condition report a range of skin symptoms including crawling, biting and stinging sensations; granules, threads or black speck-like materials on or beneath the skin; and/or lesions (e.g., rashes or sores) and some sufferers also report systemic manifestations such as fatigue, mental confusion, short term memory loss, joint pain, and changes in vision.

Skin layer of cells (*stratum granulosum*) have gaps between cells sealed against leakage by tight junctions - a "skin battery" - with molecular ion pumps of 70mV between inside & outside (inside positive). When skin breaks, current flows towards wound, sensed by *fibroblasts* cells which then migrate towards wound. When they get there, they make *collagen fibres* to form new tissue to fill wound. Sometimes, they overdo, form raised "hypertrophic" scars that are often pigmented and resemble *Morgellons* lesions. EHS symptoms may involve radiation weakening cell membranes by removing important calcium ions, so that they leak. When this happens to sensory cells, they send signals to brain, give false sensations such as "pins and needles", heat, pain and crawling over the skin, etc. depending on affected cells. If the cells *stratum granulosum* leak, currents would flow towards the leaks, as if there were physical wounds, attracting *fibroblasts* to area and the formation of raised pigmented lesions similar to those of *Morgellons* disease.

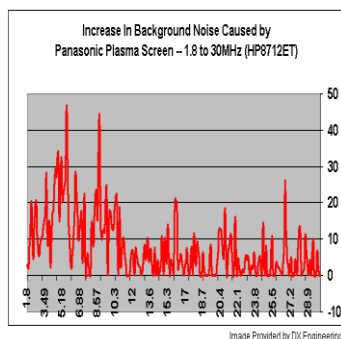


Morgellons sufferers should try to avoid all forms of electromagnetic radiation (especially cell phones, cordless phones and Wi-Fi) to see if this results in any improvement to their condition.

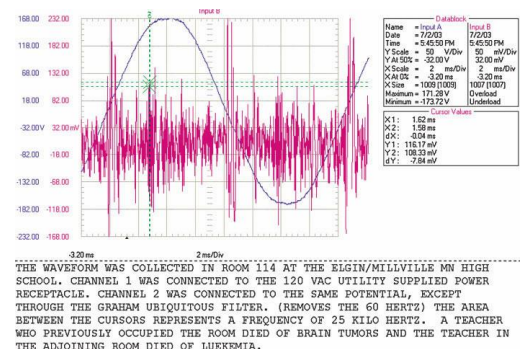
How are wireless emissions delivered? Wiring in North America is often connected to municipal water mains. This allows *net current* to flow according to use of circuits with wiring errors, start-up of appliances located throughout a neighbourhood that is inter-connected with conducting water mains and electrical supply. If grounding rods are used, only a portion of current is typically diverted from the electrical distribution system. Right: net current – *Variation over 24 hours to water mains compared to grounding rods only – in residential setting. (Manitoba Hydro)*



The environment is polluted randomly with a variety of waveforms, intensities and frequencies – all which is very confusing and stressful for living systems. Radio-frequency and wireless technology signals enter indoor wiring and outdoor water mains and power-lines via the neutral and grounding wires.



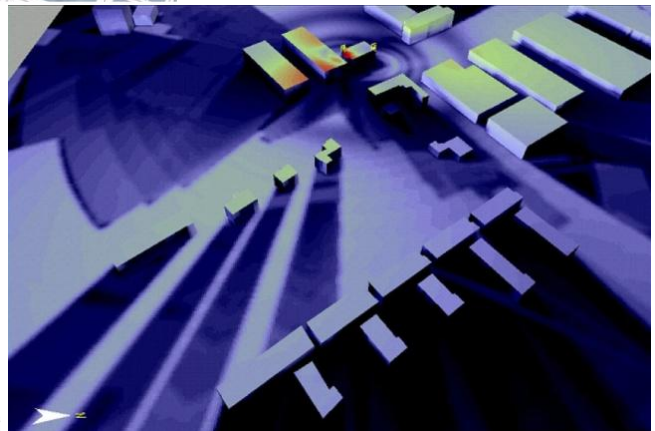
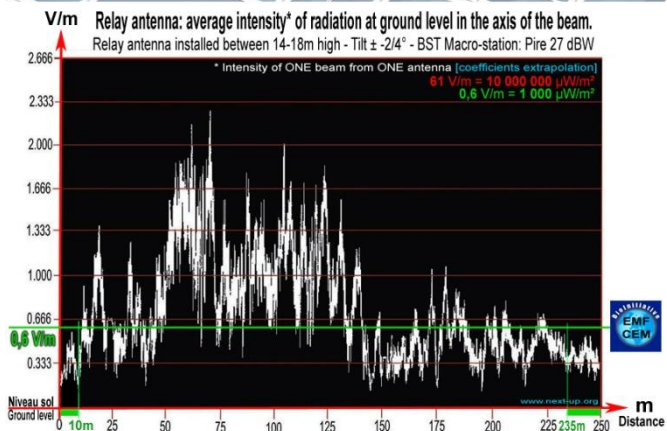
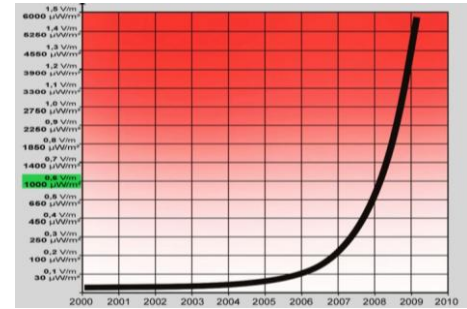
The left image shows the "noise" from a plasma screen while other shows the presence of many such signals in wiring in a Minnesota school room.



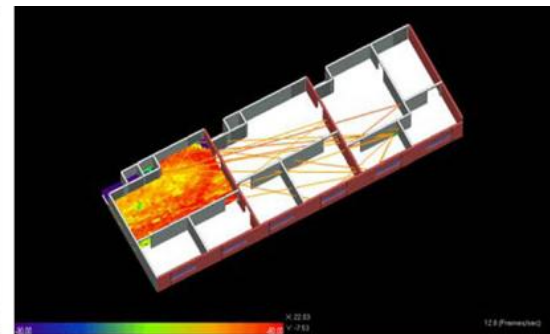
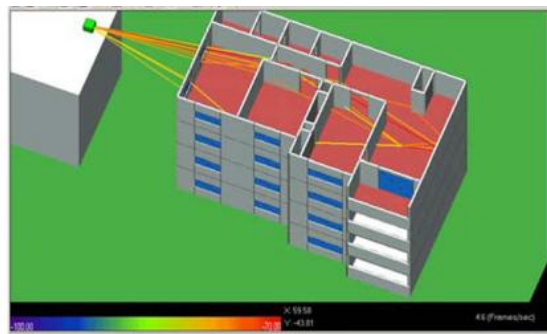
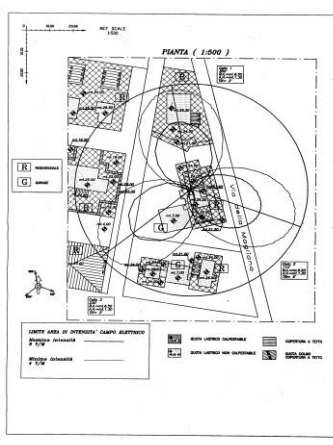
The geography of the spread of environmental wireless emissions in the environment is demonstrated with these illustrations: Below: Salt Lake City. (Paul M. Torrens, Geography, Arizona State University); Left bottom: average

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intensity of wireless power density at ground level along beam axis; typical background environmental wireless emission levels years 2000 – 2009, France with in 2009: 0.6 *microWatt/cm²*, Toronto is 2.5 to 500 range, with zones of over 1,000 *microWatt/cm²*, Bottom right: Salzburg urban shadow effects from emitters.



Below are typical emission pattern for cell-phone antenna, Italy. Right: effect of beaming indoors from outdoor emitter – note conduction, focusing & reflection patterns; typical bouncing and reflection of signals from indoor emitters (DECT, etc).



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The environmental wireless emission levels vary in Canada. The outdoor readings shown below have increased by 5 to 20-fold to those indicated below.

Background power emissions (0.5 MHz – 3GHz band) selected Canadian cities, 2007 $\mu\text{Watt}/\text{cm}^2$

| City | $\mu\text{Watt}/\text{cm}^2$ | City | $\mu\text{Watt}/\text{cm}^2$ |
|------------|------------------------------|------------------------|------------------------------|
| Windsor | 0.2 - 15 | Cornwall | 0.3 - 5 |
| London | 0.2 - 5 | Ottawa | 0.1 - 25 |
| Brantford | 0.8 - 50 | Montreal | 0.1 - 10 |
| Hamilton | 2 - 10 | St-Hyacinthe | 0.1 - 4 |
| Burlington | 1 - 10 | Mississauga | 4.0 - 25 |
| Oakville | 1 - 15 | Drummondville | 0.1 - 4 |
| Toronto | 2.5 - 120 | Laval | 0.1 - 5 |
| Ajax | 1 - 10 | St-Sauveur / Ste-Adèle | 0.1 - 3 |
| Oshawa | 1 - 10 | Mirabel | 0.3 - 8 |
| Trenton | 0.2 - 20 | Gatineau | 0.1 - 5 |
| Belleville | 0.2 - 5 | Renfrew | 0.1 - 3 |
| Kingston | 0.3 - 5 | Peterborough | 0.3 - 3 |

How indoor zones are affected by outdoor and indoor emissions is indicated below.

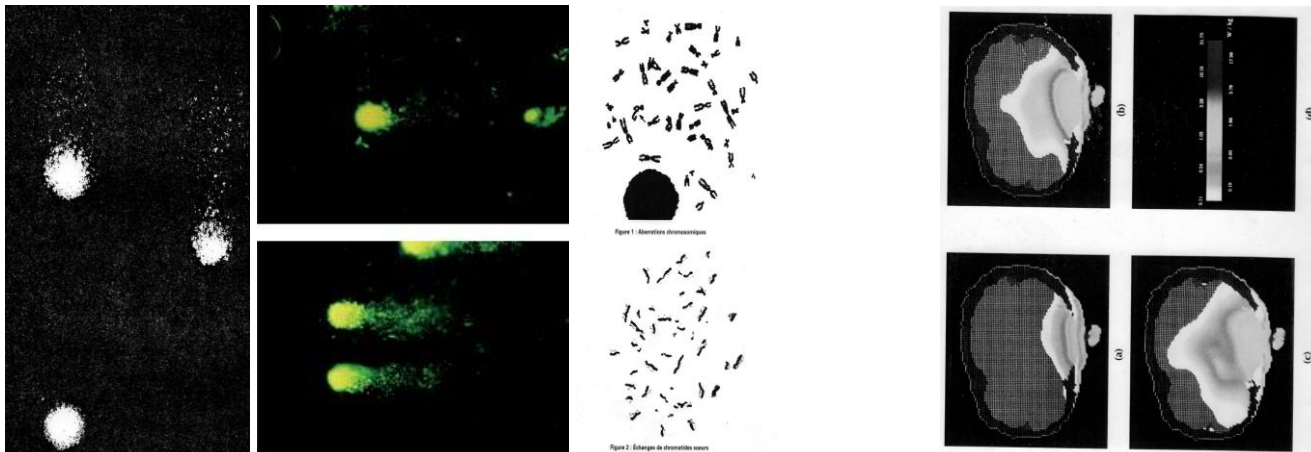
Averages of radiofrequency and microwave power, 67 rooms in $\mu\text{Watt}/\text{cm}^2$ / sample size, Montreal Region, 2008

| location | background | As is | wireless on |
|------------------------|------------|----------|-------------|
| Master bedrooms | 0.004/6 | 0.087/10 | 0.095/10 |
| All bedrooms | 0.005/12 | 0.041/23 | 0.088/23 |
| Baby bedrooms (crib) | 0.003/4 | 0.025/5 | 0.074/5 |
| Kitchen (at sink) | 0.055/6 | 0.093/10 | 0.097/10 |
| Living room (at couch) | 0.017/6 | 0.023/10 | 0.066/10 |
| Dining Table | 0.051/6 | 0.080/10 | 0.238/10 |
| Workstations | 0.017/9 | 0.226/14 | 0.255/14 |

average, background **0.043/43**

average, indoors **0.106/164**

The de-granulation of brain cells (left), centre, chromosome changes from non-thermal exposure to cell phone level emissions is shown below. Centre: a comet assay of a normal cell shows little DNA damage; below, the same assay of cells exposed to typical cell phone shows "tails" of damaged DNA. (Henry Lai). To the right is shown the penetration of heat into brain by cell phone emissions. A: adult, B: 10 year-old, C: 5 year-old. The IEEE Whole Body SAR – Specific Absorption Rate for the whole body is 0.4 Watt/Kilogram – and 1.6 W/Kg for ears; the actual SAR from typical cellphones EXCEEDS standards: 2.93 W/Kg for the brain of adults, 3.21 W/Kg for 10 year-olds' brains and 4.49 W/Kg for 5 year-olds' brains. These levels are conducive to non-reversible non-thermal effects. O. P. Ghandi, 1996 IEEE Trans Microwave Theory & Techniques 44:1884-97



BIOLOGICAL EFFECTS OF WIRELESS TECHNOLOGIES BELOW CANADA’S REGULATORY LIMIT

Power density Reported Biological Effects
($\mu\text{W}/\text{cm}^2$)

0.000000000001 Altered genetic structure in E. Coli
 0.0000000001 Threshold of human sensitivity
 0.000000001 Altered EEG in human subjects
 0.0000000027 Growth stimulation in *Vicius fabus*
 0.00000001 Effects on immune system in mice
 0.00000002 Stimulation of ovulation in chickens
 0.000005 Effect on cell growth in yeast
 0.00001 Conditioned “avoidance” reflex in rats
 0.000027 Premature aging of pine needles

References

Belyaev 1996
 Kositsky 2001
 Bise 1978
 Brauer 1950
 Bundyuk 1994
 Kondra 1970
 Grundler 1992
 Kositsky 2001
 Selga 1996

0.001 100 Yards / metres from a Cell Phone

0.0027 Growth inhibition in *Vicius fabus*
 0.0027 to 0.065 Smaller tree growth rings

Brauer 1950
 Balodis 1996

0.007 50 Feet from a Cordless Phone

0.01 Human sensation

Kolbun 1987

0.016 1 Mile from a Cellular Tower

0.06 Altered EEG, disturbed carbohydrate metabolism, enlarged adrenals, altered adrenal hormone levels, structural changes in liver, spleen, testes, and brain in white rats and rabbits
 0.06 Slowing of the heart, change in EEG in rabbits

Dumanskij 1974
 Serkyuk, reported in McRee 1980

0.05 10 Feet / 3 meters from a Wireless Computer

0.1 Increase in melatonin in cows
 0.1 to 1.8 Decreased life span, impaired reproduction, structural and developmental abnormalities in duckweed plants
 0.13 Decreased cell growth (human epithelial amnion cells)
 0.168 Irreversible sterility in mice
 0.2 to 8.0 Childhood leukemia near transmitters
 0.3 Impaired motor function, reaction time, memory and attention of school children, and altered sex ratio of children (fewer boys)
 0.6 Change in calcium ion efflux from brain tissue
 0.6 Cardiac arrhythmias and sometimes cardiac arrest (frogs)
 0–4 Altered white blood cell activity in schoolchildren
 1.0 Headache, dizziness, irritability, fatigue, weakness, insomnia, chest pain, difficulty breathing, indigestion (humans—occupational exposure)
 1.0 Stimulation of white cells in guinea pigs
 2.5 Breakdown of blood-brain barrier (used a digital cell phone to radiate)
 5.0 Leukemia, skin melanoma and bladder cancer near TV and FM transmitter
 2.0 (lower “Microwave hearing” - clicking, buzzing, chirping, hissing, or high-pitched threshold not tones known)
 5.0 Biochemical and histological changes in liver, heart, kidney, and brain tissue
 10.0 Damaged mitochondria, nucleus of cells in hippocampus of brain
 10.0 Impaired memory and visual reaction time in people living near transmitters
 10.0 Decreased size of litter, increased number of stillborns in mice
 10.0 Redistribution of metals in the lungs, brain, heart, liver, kidney, muscles, spleen, bones, skin, blood

Stark 1997
 Magone 1996
 Kwee 1997
 Magras 1997
 Hocking 1996
 Kolodynski 1996
 Dutta 1986
 Frey 1968
 Chiang 1989
 Simonenko 1998
 Shandala 1978
 Salford 1997
 Dolk 1997
 Frey 1963, 1969, 1971, 1973, 1988
 Justeson 1979, Olsen 1980, Wieske 1963, Lin 1978
 Belokrinitskiy 1982
 Belokrinitskiy 1982a
 Chiang 1989
 Il’Chevich (reported in McRee 1980)
 Shutenko 1981

1,000.0 United States FCC Exposure Limit, Safety Code 6 Canada limit

INTERNATIONAL Radiofrequency / Microwave EXPOSURE STANDARDS

| Country | Exposure level ($\text{microW}/\text{cm}^2$) |
|---|--|
| New South Wales, Australia | 0.001 |
| Salzburg, Austria (pulsed transmissions) | 0.1 |
| Russia / Bulgaria / Hungary/ Switzerland | 2–10 |
| Belgium | 3 |
| China | 7–10 |
| Italy / Toronto | 10 |
| Auckland, New Zealand | 50 |
| Australia | 200 |
| New Zealand / Japan / Germany/ US /Canada | 200–1,000 |
| United Kingdom | 1,000–10,000 |

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Power
in *microWatt/cm2*

Observed result - from:

0.05 10 Feet /3 meters from a Wireless Computer

- 0.1 Increase in melatonin in cows
- 0.13 Decreased cell growth (human epithelial amnion cells)
- 0.168 Irreversible sterility in mice
- 0.2 to 8.0 Childhood leukemia near transmitters
- 0.3 Impaired motor function, reaction time, memory & attention of school children (fewer boys)
- 0.6 Change in calcium ion efflux from brain tissue
- 0.4 Altered white blood cell activity in schoolchildren
- 1.0 Headache, dizziness, irritability, fatigue, weakness, insomnia, chest pain, difficulty breathing, indigestion
- 2.5 Breakdown of blood-brain barrier (from digital - pulsed - cell phone emissions)
- 5.0 Leukemia, skin melanoma and bladder cancer near TV and FM transmitter
- 2.0 Lower “Microwave hearing” - clicking, buzzing, chirping, hissing, or high-pitched threshold note tones known
- 5.0 Biochemical and histological changes in liver, heart, kidney, and brain tissue
- 10.0 Damaged mitochondria, nucleus of cells in hippocampus of brain
- 10.0 Impaired memory and visual reaction time in people living near transmitters

Meg Sears, *Medical Perspective on Environmental Sensitivities*, Canadian Human Rights Commission, 2007

| Appliance, device (dry weather conditions) | $\mu\text{Watt/cm}^2$ |
|--|---|
| Cellphone @ user | 9 – 3,500 |
| Cellphone, second hand exposure | 1 - 200 |
| Microwave oven @ user | 10 – 2,000 |
| Cordless phone base station @ 2 to 6m | 7 - 17 |
| Analog in urban environment (1-2 blocks away) | 5 – 25 |
| Digital in urban environment (within 100m) | 0.2 - 5 |
| Analog in rural environment 500m | 0.25 - 30 |
| Local amplification by metal window, door frames, studs, metal plumbing, grounding wire, unfiltered telephone and Cable TV wires | 1 to 4.5 fold power increase |

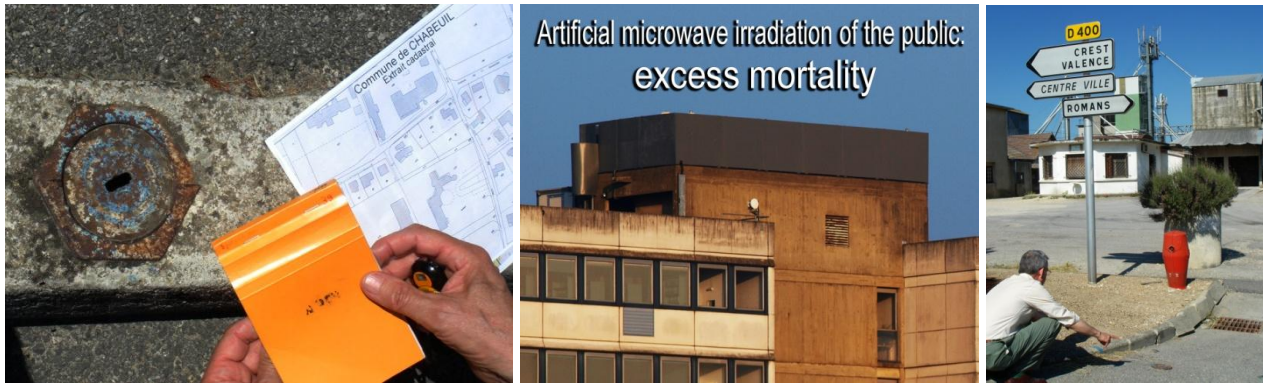
There has been a significant increase in corrosion problems in the last few decades, parallel to the spread and implementation of wireless technologies. Whereas in the 1970s, only a small number of engineers consulted on corrosion problems, now a full quarter of all engineers in North America are experts in corrosion trying to resolve problems associated with building structures, water and oil and gas pipelines, fluid containers. How radiofrequencies affect corrosion can be verified by anyone who replaces a fluorescent compact bulb into a metallic fixture that once had an incandescent bulb. It takes only a few weeks to have the onset of paint coating corroding in lamp holders, followed by the steady eating away of metallic sheeting. Likewise, one can see which urban areas are exposed to elevated levels of microwave emissions: where sewer and telephone service covers rust – actually powder away rather than just coat themselves with oxidation, where fire hydrants crumble – even if installed within the previous 6 months - that is likely to be a zone subject to microwave emissions. Normally, such fittings last problem-free for decades. This is an effect of enormous burden to tax and rate-payers.

In 2008 the **Federation of Canadian Municipalities** has made an emergency plea to the federal government for \$123 Billion within 5 years to avoid building collapses in Canadian cities due to corrosion, which only emphasizes how outrageously expensive for our civilization is this problem of accelerated corrosion from radiofrequencies and microwaves is. What is little known is that most corrosion is induced by weak voltages and amperages from net currents in our electric power delivery systems, which are imbalanced. What is even less known that as the electric power system becomes more affected by the use of computers and wireless systems, radiofrequencies and microwaves penetrate the electric power system’s ground via neutral wires. The ground in many populated areas now carries charges that are highly electronic with radiofrequency and microwave characteristics. This new phenomenon accelerates corrosion of materials – whether pipelines, rebars in buildings and transportation infrastructure or even nuclear power plant reactor rods - by quantum leaps. Galvanic coupling between alloys and hydrogen and e particles is

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accelerated, leading to hydrogen-induced cracking in steels. This conduction of charges has been observed with electrochemical impedance spectroscopy (EIS) and reported this year by scientists from **Atomic Energy of Canada** and the **National Research Council of Canada**. There is also greater spattering of deposits, crevice enhancements and oxidation reactions.

Accelerated corrosion from environmental wireless pollution is shown by these images from France.



Rural wireless emissions issues have emerged. These have impacts on agriculture productivity. Emissions are sometimes carried by power lines, ground currents, and rural electric distribution practices. They can be sourced by special wireless technology installed in farms, etc.

These are believed to render even quality soils compacted hard. (The phenomenon has been noted even in Mennonite communities Pennsylvania, known for their former rich and unadulterated humus). Water runs off on the surface instead of soaking, roots have difficulty penetrating; this results in greater susceptibility to insect invasions and diseases nutritional value of crops affected. Effects are widespread, as is the case of a low-value corn crop of 2009 (from Ontario to Wisconsin).

Livestock health is of considerable concern, with decreased nutritional absorption, susceptibility to diseases. Animals can experience microwave burns on their hooves.

There are reports of changes in bird migration which may indicate that the sciatica of birds in flight is pained from microwave emissions.

The image to the right shows how 2 adjacent corn crops in the same field adjust themselves to variations of environmental stresses. In the forefront is a field with typical chemical and electromagnetic inputs.

The rear field is without such stresses – no fertilizer, pesticides and avoidance of electromagnetic emissions: it produces large crop, with higher quality *brix* yields. (Peter Webb, Eastern Ontario)

Influenza has a tendency to mutate into new serotypes and it is suggested that novel radiofrequency/microwave emissions (waveform, frequency, radiation mode, intensity) enable mutation into strains that do not meet adequate immunity responses. The 1918-19 pandemic of Spanish flu – which killed more persons than World War I, started on the world's first radio ship, as the surviving seaman collapsed at Bordeaux harbour from an avian flu virus that was genetically modified with on-board wireless equipment into a variation to which humanity had not acquired an immunity to. A more recent serotype in Hong Kong (2003) may have been the result of a combination of the introduction of a novel wireless technology, geography, moisture (and aerosol activity) and sanitary conditions; likewise, for the most recent cases of mutated avian flu in Beijing some weeks ago. Vietnam (2004) and Indonesia, with their own technological introduction of wireless technology and special fauna might have become new conditions for mutation, when historically they have not been in the past. Once in a while there are reports in luxury liners of unexplained mass health problems, clearly not associated with food poisoning, which may have been spawned as mutations with the introduction a high-tech wireless systems on board in conjunction with coastal security technologies.



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It would be worthwhile to elaborate on the Fraser Valley, British Columbia avian flu poultry issues as it covers several specializations: DNA effects from RF/mw exposure, radiation patterns (including re-radiation inside structures and from surrounding mountain chains), effects of weather (soil moisture) on intensity of signals, including those of other antennae sources through a beating process, etc. I believe that collectively we can develop a good case study and that we might even find funding to support it to a high level of detail and quality.

The deadly Walkerton, Ontario *Escherichia.Coli* strain was a rare, more deadly form only found in remote jungle of El Salvador. How did it get to Walkerton, and infect the community's water supply? The summer that spawned it was unusually wet, to the point that cattle manure overflowed in fields with their prominent *E.Coli* constituent of digestive flora being exposed to very powerful analog cellphone tower emissions, in tandem with other radiofrequency fields source to able to achieve a critical mass situation leading a locally-mutated *E.Coli* strain.

It is estimated that at least 300,000 Canadian children are being exposed to, and, are absorbing, "illegal levels" of microwave power associated with cellphone usage alone. This number is expected to double by 2010, even though the actual total base population of children is expected to decrease. These children face severe (or life-threatening) wireless-related physical conditions. Add to this group about 300,000 in Ontario alone who suffer from some form of autism, considering that 30 years ago, there were only a few hundred cases. More than 1 child in 100 is autistic, compared with 1 in 10,000 only 30 years ago, before the pervasive environmental exposure of wireless technologies. A study by **Tamara Mariea** and **George Carlo** indicates how wireless emissions can make cells incapable of releasing heavy metals (including mercury and aluminum), such as those used as stabilizers in the massive vaccination programmes. Heavy metals in the body interfere with the distribution of *dopamine*, a hormone and a neurotransmitter which controls motor skills. In autistic children, such functions are inhibited. When autistic children are detoxified from heavy metals, and when they are no longer exposed to wireless emissions, they can recover. This situation has the potential for trans-generation toxic accumulation.

Experimental observations with low-level microwave exposure

| Observation | Effects of microwave emissions | Exposure level |
|------------------------------|--|--|
| Effects on DNA | Single and double-strand breaks, electron flows within staked base pairs of double helix of DNA molecules, direct gene transcription, 40-90% increase in <i>Fos mRNA</i> from cellphone signals, | 2h, 0.6W/kg, 0.001W/kg |
| Blood-brain barrier | Toxins may reach brain tissues: serotonin, glucose, selective permeability, allows glucose to pass | After 2 minutes, as low as 0.0004W/kg |
| Psychoactive Drugs | Neurotransmitter functions modified: Pentobarbital (alters narcosis), entylenetetrazol (more convulsions), Curare (less anaesthesia), Valium, Librium (potentiated). Endogenous <i>opiods</i> activated: increase in alcohol use, less of withdrawal symptoms in morphine-dependents | |
| Glaucoma, corneal eye damage | Worsen effects. | |
| Behavioural changes | Major errors in judgment, vision altered; disruptive attitude (hyperactivity); memory problems, [non-lethal weapons for combat advantage]; <i>synthase</i> inhibition caused by increase in body nitric oxide production by digital (pulsed) signals | |
| Cognitive functions | Faster reaction time, auditory memory retrieval [mind control], difficulty in concentration, "fuzzy thinking", dizziness (indication of <i>serotonin</i> activity increase) | 0.16 μ Watt/cm ² |
| Sleep | May promote sleep, sleepiness, reduction of REM sleep (important to memory, learning) | |
| Melatonin | Melatonin secretion decreases | |
| Fundamental life processi | ELF-encodes in wireless transmissions may imitate heartbeat, cellular communications, brainwaves, cell growth, human metabolism; sperm count lowered, irreversible infertility in mice after 5 generations from "an antenna park", chicken embryo mortality increases by half | As low as 0.005 W/kg |
| Dose-dependency | Observed in Korean War, US embassy personnel in Moscow, cumulative effects | |
| Microwave syndrome | Fatigue, irritability, nausea, anorexia, depression Cardiovascular disorders, hypo/hypertension Change in skin, skin allergies, eczema, psoriasis Increase in <i>lymphocytes</i> , effects in EEGs, reduced insulin production, multiple allergies, <i>Tinnitus</i> , itches in the ear, ears feel heated | As low as 0.02 to 8.0 μ Watt/cm ² |

There are changes in public policy on the issue of wireless electromagnetic fields: "The limits on exposure to electromagnetic fields which have been set for the general public are obsolete." In February 2009, the European Parliament **Committee on the Environment, Public Health and Food Safety** voted 43 - 1 to recognize this objection.

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Addressing the question of radiofrequency/microwave wireless technology emissions, Dennis Kucinich, **US Domestic Policy Committee** Chairman wrote to Kevin Martin, FCC Chairman on Nov. 3, 2008, “The NAS Report support the NTP’s conclusion that the research record upon which FCC’s RF Safety Guidelines are based does not adequately safeguard the public from non-thermal chronic exposures” **The Bamberg Appeal**, sent to President Obama February 12, 2009 states, “Since immediately, after digital television stations had started transmitting, adverse health effects have occurred, the review of the Guidelines announced by the ICNIRP is imperative.”

There are 2 recent landmark rulings: in France, a power company was ordered to compensate cattle farmers for EMF damages to animals. On November 14, 2008, **Agence France Presse** reported, “In ordering the management of **RTE** (responsible for the distribution of electricity) to pay almost 400,000 Euros to cattle farmers, the courts have established for the first time that there is a link between the effects of electromagnetic radiation from a very high voltage power line and symptoms of diseases among animals”). Similarly, telephone company **Bouygues Telecom** was ordered on February 4, 2009 by a Versailles appeals court to dismantle cellphone towers in the Lyons area on the basis of the **Precautionary Principle** and the potential health risk for nearby residents. The ruling is significant because it draws on research such as the *BioInitiative report* as well as doctors’ Appeals of Salzburg (Austria), Freiburg and Bamberg (Germany) and Helsinki (Finland).

Environmental microwave power levels are too high for even minimum health risk conditions. Health practitioners do not consider general exposure conditions during diagnosis, or during therapy.

Employers do not realize how microwaves affect performance, health and safety of employees.

Appropriate design and oversight can provide safe and generally no-risk field levels. Implementation of these measures, often at no/low cost requires demand for common sense.

Those who issue permits are in frontline for complaints and legal filings and they are, legally, accomplices. The **City of Toronto** has guideline that provides precedence that communities can emulate.

European Parliament expert analysis in 2000, which included World Health Organization, European Community and scientific peers recommended that average annual exposure near microwave emitters should not exceed $0.10 \mu\text{Watt}/\text{cm}^2$ (*compare*: The Italian Government “quality target”). Anyone exposed to higher fields should receive regular medical attention, including blood analysis, EEG and ECG tests. All zones with higher exposure rates should be posted with markings on pavement and with road signs.

There are serious public health concerns about the consequences to physical and mental human health from exposure both at home, at work and in many public places to man-made sources of electromagnetic radiation (EMR) from devices such as cell phones, Wi-Fi / WiMAX / Bluetooth, routers, antenna sites, broadcast towers and high-voltage power lines and grids.

There is a need to establish whether there is a link between wireless technologies and modification of DNA in humans, animals or plants, accelerated population aging, Alzheimer's, psycho-social behavioural problems, neurodegenerative diseases, fertility and reproduction problems, immune systems disorders, insomnia and electro-hypersensitivity and between the use of mobile phones and certain types of cancer, including brain, auditory nerve, and parotid gland tumours. Other impacts include: acceleration of corrosion of strategic infrastructures, for example of buildings, bridges, pipelines and nuclear power stations.

Until these studies have been carried out, the application of the precautionary principle should apply in nurseries, schools, colleges, universities and other public places frequented by children, teenagers and in public areas such as libraries, hospitals, public transport and playgrounds. In Luxembourg the Government has opted to apply the precautionary principle and their population is protected almost 14 times more securely from electromagnetic fields than other European citizens. While there is no doubt that many wireless devices have brought improvements to quality of life the continuing uncertainties about possible health risks and scientific studies to date have raised concerns that the public is not sufficiently protected from the adverse physical and mental health effects of these technologies.