Electromagnetic Radiation and Health

C4ST – Citizens for Safe Technology
On May 31st, 2011, the World Health Organization classified radio frequency electromagnetic fields as a possibly carcinogenic to humans (Class 2B)
Wi-Fi uses *microwave radiation* (also referred as radio frequency radiation) at two different frequencies 2.4 and 5.8 GHz. The 2.4 GHz is similar to that used in a microwave oven.
WHAT IS ELECTROMAGNETIC RADIATION

- Electromagnetic Radiation (EMR) is emitted by multiple everyday wireless technology sources.
- EMR generated and emitted by wireless technologies is an invisible and insensible environmental pollutant.
- Many studies exist that challenge the aged theory that EMR\(^1\) is only harmful at certain levels.
- A significant and growing percentage of our population suffer ill health effects caused by emissions from everyday wireless devices and infrastructure.

\(^1\) Various terminology exists for EMR: non-ionizing radiation, microwave radiation, electromagnetic fields (EMF), radiofrequency energy, and others.
Electromagnetic Radiation (EMR) is emitted by multiple sources:

- Cell phones, Smart phones
- Cell towers, antennae
- Wireless internet (Wi-Fi)
- iPad, iTouch, tablets
- Cordless phones
- PDAs – Blackberry, Treo, iPhone
- Baby monitors
- Smart Meters
- Wireless: laptops, printers, mice, keyboards, speakers
- Wireless routers, desktop computers, wireless appliances
- Microwave ovens
OUTDATED GOVERNMENT POSITIONS

The Radio Telecommunications Act regulates cell towers and antennae through Industry Canada (IC) which does not require public notification or consultation when:

- New towers/antennas are less than 15 metres in height.
- The antenna is added to an existing structure (e.g., pole, building, church, hospital, school).

When IC allows public involvement, comments are restricted to impacts from infrastructure appearance, security and construction.

When IC depends on Safety Code 6 there is no protection for the health of the public.

Provincial medical health officers state “there is no convincing evidence that exposure to levels of radiation below those allowed by SC6 is harmful.” Yet there is much credible research to the contrary.
DEFINITIONS AND TERMS

- The Electromagnetic Spectrum (see next slide) is measured in Hertz. Historically, we believed that low frequency (Non-ionizing radiation) was safe. Studies now show, that over long periods of time, there are harmful effects from non-ionizing radiation.

- The term used to describe the absorption of EMR in the body is specific absorption rate (SAR), which is the rate of energy that is actually absorbed by a unit of tissue.

- Actual measurement of SARs is very difficult in real life so measurements of electric and magnetic fields are used as surrogates because they are easier to assess.

- As a result, the intensity of EMR is generally measured and noted in scientific literature in microwatts per centimetre squared $\mu$W/cm².
# CANADA STANDARD COMPARISON

<table>
<thead>
<tr>
<th>Exposure limits for RF fields</th>
<th>Country or Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 μW/cm²</td>
<td>Precautionary limit in Salzburg</td>
</tr>
<tr>
<td>10.0 μW/cm²</td>
<td>Precautionary limit in Paris</td>
</tr>
<tr>
<td>10.0 μW/cm²</td>
<td>Exposure limit in Russia</td>
</tr>
<tr>
<td>10.0 μW/cm²</td>
<td>Exposure limit in China</td>
</tr>
<tr>
<td>10.0 μW/cm²</td>
<td>Exposure limit in Switzerland</td>
</tr>
<tr>
<td>10.0 μW/cm²</td>
<td>Exposure limit in Italy</td>
</tr>
<tr>
<td>10.0 μW/cm²</td>
<td>Precautionary limit set by Toronto Board of Health</td>
</tr>
<tr>
<td>1000.0 μW/cm²</td>
<td>Health Canada Safety Code 6</td>
</tr>
</tbody>
</table>
CANADIAN HEALTH AT RISK

  - Same category as lead, dioxane, chloroform, DDT, ethylbenzene.
- Exposure to EMR is generally uncontrolled, like 2nd hand smoke...except that conventional walls do not block EMR
- Thousands of studies have found harmful health effects from exposure to the radiation emitted by mobile phones, cell towers and antennas, WiFi and smart meters.
- Health Canada SC6 guidelines are obsolete and not protective.
“...growing body of scientific evidence which suggests that exposures to RF fields at intensities far less than levels required to produce heating can cause effects on cells and tissues...”

Over 40 individual calls for research
In October, 2011, Health Canada issued a cell phone use warning for children under 18.

- “encourages parents to reduce children's RF (radiofrequency radiation) exposure from cell phones since children are typically more sensitive to a variety of environmental agents”

- “there is currently a lack of scientific information regarding the potential health impacts of cell phones on children”.
Unlike other public health and environmental issues (such as asbestos, lead, tobacco and other chemical exposures), hazards of acute and chronic exposure to electromagnetic radiation is of extreme concern as the entire population is exposed and at risk almost everywhere.
CHILDREN ARE NOT “LITTLE ADULTS”

Radiation from cell phones and other sources penetrates deeper into the head of children. Certain tissues of a child’s head, e.g., the bone marrow and the eye, absorb significantly more energy than those in an adult head.

Starting to use cell phone before the age of 20 results in a 5 fold increase in glioma and acoustic neuroma.

Many of today’s children start getting exposed from birth.

3. Dr. Lennart Hardell, MD, PhD and Professor at University Hospital in Orebro, Sweden
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2012</td>
<td>India to Cut Cellphone Tower Radiation by 90%</td>
</tr>
<tr>
<td>October 2011</td>
<td>Health Canada encourages children under 18 to limit the time they spend talking on cell phones</td>
</tr>
<tr>
<td>May 2011</td>
<td>International Agency for Research on Cancer (IARC) and World Health Organization (WHO) reclassified radio frequency electromagnetic fields as a Class 2B carcinogen; other qualifiers: lead, DDT</td>
</tr>
<tr>
<td>May 2011</td>
<td>The Parliamentary Assembly Council of Europe (PACE) released Resolution 1815 on the Potential Dangers of Electromagnetic Fields and their effect on the Environment</td>
</tr>
<tr>
<td>April 2011</td>
<td>Russian National Committee on Non-Ionizing Radiation Protection (RNCNIRP) released their Resolution entitled “Electromagnetic fields from Mobile Phones: Health Effect on Children and Teenagers”</td>
</tr>
<tr>
<td>2010</td>
<td>Seletun Statement, Norway: The International Electromagnetic Field Alliance (IEMFA)</td>
</tr>
<tr>
<td>2009</td>
<td>Porto Alegre Resolution, Brazil</td>
</tr>
<tr>
<td>2007</td>
<td>BioInitiative Report, USA.</td>
</tr>
<tr>
<td>2002</td>
<td>Freiburg Appeal, Germany. Physicians request tougher guidelines for radio frequency exposure</td>
</tr>
</tbody>
</table>
The increasing presence of technology in our environment is generating new concern about exposure to electromagnetic radiation for Canadians, especially today’s and tomorrow’s children whose 21st-century exposures are unprecedented.
Citizens for Safe Technology is a not-for-profit, volunteer-based coalition of parents, citizens and experts whose mission is to educate and inform Canadians and their policy makers about the dangers of the exposures to unsafe levels of electromagnetic radiation from technology and to work with all levels of government to create healthier communities for children and families from coast to coast.
It is critical that all levels of Government

- Acknowledge that current assumptions about the safety of electromagnetic radiation (EMR) are outdated and must be revised.
- Offer protection and choice for electrosensitive individuals and children who are exposed to EMR in their homes and schools.

- Implement the recommendations of the House of Commons, **Standing Committee on Health 2010 Report**.
- Provide **full disclosure** for all information regarding all studies and documents reviewed, included and excluded; funding of all participants.
- **Update** all analysis/guidelines to keep pace with the rapid acceleration of technology.
C4ST: GOALS

3 Industry Canada must update CPC-2-0-03 Radiocommunication and Broadcasting Antenna Systems.

- Eliminate exemption guidelines and notify residents of all new cell towers or antennae planned in their community.
- Consultation must include all issues of concern to the public.
- Some real authority needs to rest with local land use authorities.
C4ST STRATEGY

Educate Canadians to gain support for reduced limits on EMR emissions, prioritizing the protection of Canadian families and their rights to safe living spaces.

Advocate for change through a proactive government relations strategy and extensive educational and media campaigns.

Promote credible alternatives based on the precautionary principle in respect to everyday exposures; more stringent requirements may be required to protect those more vulnerable, including children, elderly, immune compromised and electrosensitive.

Provide education, awareness and recommendations for safer use and reduce or eliminate radiation from consumer products where possible.

Leverage other organizations to assist in reinforcing and sharing the message that Health Canada’s SC6 is not protective of Canadians in the 21st century and now is the time for change.
We have National Teams in the following Focus Areas:

- WiFi in Schools
- Smart Meters
- Cell Towers and Antennae
- Electrosensitivity
- Radiation from Consumer Products
- Environment (Fauna and Flora)
- Legislation
- Legal
HOW CAN YOU HELP?

Continue to educate yourself: www.c4st.org

Share this message with your friends, families and co-workers

Please volunteer, send us an email (info@c4st.org)
The Precautionary Principle is enacted when there are plausible, serious and irreversible hazards, where there are many uncertainties and much scientific ignorance. Electromagnetic radiation is characterized by such circumstances.
Average increase observed in urban area of artificial HF microwave radiation from 900 MHz - 2.5 GHz

Valeur moyenne constatée en milieu urbain de l’irradiation artificielle HF micro-onde de 900 MHz - 2,5 GHz
### COMPARISON OF RF EXPOSURE LIMITS

#### International Radio Frequency "RF" Exposure Limits for 1800 MHz Range

<table>
<thead>
<tr>
<th>Location</th>
<th>Reference</th>
<th>Exposure time</th>
<th>Limit Based On</th>
<th>Lower by</th>
<th>μW/m²</th>
<th>V/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Safety Code 6, Table 5</td>
<td>6 minutes</td>
<td>Thermal / Heating</td>
<td>-</td>
<td>10,000,000</td>
<td>61.4</td>
</tr>
<tr>
<td>USA</td>
<td>(FCC) IEEE C55.1-1999 and ICNRP</td>
<td>30 minutes</td>
<td>Thermal / Heating</td>
<td>-</td>
<td>10,000,000</td>
<td>61.4</td>
</tr>
<tr>
<td>Most of Western Europe</td>
<td>IEEE C55.1-1999 and ICNRP</td>
<td>30 minutes</td>
<td>Thermal / Heating</td>
<td>-</td>
<td>10,000,000</td>
<td>61.4</td>
</tr>
<tr>
<td>Russia</td>
<td>Sanitary Norms and Regulations 2.2.42.1.E.055-96</td>
<td>2 hours +</td>
<td>Biological Effects</td>
<td>100 x</td>
<td>100,000</td>
<td>6.14</td>
</tr>
<tr>
<td>China</td>
<td>UDC 844,856.5 GB 9175–68</td>
<td>3 hours +</td>
<td>Biological Effects</td>
<td>100 x</td>
<td>100,000</td>
<td>6.14</td>
</tr>
<tr>
<td>Italy</td>
<td>Sanitary Norms and Regulations 2.2.42.1.E.055-96</td>
<td>3 hours +</td>
<td>Biological Effects</td>
<td>100 x</td>
<td>100,000</td>
<td>6.14</td>
</tr>
<tr>
<td>Most of Eastern Europe</td>
<td>Sanitary Norms and Regulations 2.2.42.1.E.055-96</td>
<td>2 hours +</td>
<td>Biological Effects</td>
<td>100 x</td>
<td>100,000</td>
<td>6.14</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Ordinance on Protection from Non-ionizing Radiation (NSVR)</td>
<td>Long Term</td>
<td>Precautionary</td>
<td>100 x</td>
<td>100,000</td>
<td>6.14</td>
</tr>
<tr>
<td>Toronto Board of Health, Canada</td>
<td>Proposed 1999</td>
<td>Long Term</td>
<td>Precautionary</td>
<td>100 x</td>
<td>100,000</td>
<td>6.14</td>
</tr>
<tr>
<td>Bio-Initiative Report recommendation</td>
<td>Bio-Initiative Report 2007</td>
<td>Long Term</td>
<td>Biological / Precautionary</td>
<td>10,000 x</td>
<td>1,000</td>
<td>0.014</td>
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<td>Salzburg Resolution on Mobile Telecommunication</td>
<td>Preventive public health protection, Salzburg, June 7-9, 2000</td>
<td>Long Term</td>
<td>Precautionary</td>
<td>10,000 x</td>
<td>1,000</td>
<td>0.014</td>
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<td>European Parliament</td>
<td>Resolution 1815, Strasbourg, May 27, 2011</td>
<td>Long Term</td>
<td>Precautionary</td>
<td>10,000 x</td>
<td>106</td>
<td>0.2</td>
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<tr>
<td>Building Biology Guidelines Germany (Sleeping Areas)</td>
<td>SSM/2008 - Level of No Biological Concern</td>
<td>Long Term</td>
<td>Precautionary</td>
<td>100,000,000 x</td>
<td>0.1</td>
<td>0.00614</td>
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<tr>
<td>Cell Phone Operational Requirements</td>
<td>Cell Phone Operational Requirements</td>
<td>Long Term</td>
<td>Precautionary</td>
<td>10,000,000,000 x</td>
<td>0.001</td>
<td>0.000014</td>
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<tr>
<td>Natural Cosmic Radiation</td>
<td>MAES 2000</td>
<td>Long Term</td>
<td>Natural Exposure</td>
<td>10,000,000,000,000 x</td>
<td>0.00001</td>
<td>0.000014</td>
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<tr>
<td>Average Indoor Urban Exposure Toronto, Canada</td>
<td>Safe Living Technologies Inc. 2011</td>
<td>Long Term</td>
<td>-</td>
<td>200 - 5000</td>
<td>0.3 - 1.4</td>
<td></td>
</tr>
</tbody>
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* Electromagnetic Radiation from Cell Towers and Antennas
UNDERESTIMATION OF RISK FOR TEENS AND CHILDREN

Dr. Lennart Hardell

- Starting to use cell phone before age of 20 = 5 fold increase in glioma and acoustic neuroma

Dr. Devra Davis

- Deeper penetration of absorbed radiation
- Exposure of brains 2 times more than adults
- Exposure of bone marrow 10 times more than adults
- Eyes and Thyroid overexposed
ELECTROSENSITIVITY
COMMON SYMPTOMS

- Headaches, Migraines
- Insomnia, Difficult Sleep
- Heart Palpitations
- Agitation, Anxiety
- Tinnitus, Ringing in ears
- Dizziness, Vertigo
- Skin Rashes
- Nausea, Digestive problems
- Poor Blood Sugar Regulation
- Memory Loss
- Inability to Concentrate
- Extreme Fatigue
- Pain in Joints, Muscles
- Depression, Mood Changes
- Visual disruptions
- Shortness of Breath, Asthma-like symptoms
- Fibromyalgia/Chronic Fatigue symptoms
SUMMARY:

There are **No Safety Standards for Non-Thermal Exposures in Canada**

**NEED:** Safety Guidelines to protect against Non-Thermal Biological Effects which occur at exposure levels thousands of times below our safety standards – Safety Code 6

**WHY:** present Safety Guidelines are for thermal effects only and based on a 6-minute exposure for a full grown man (200 lb, 6 feet) – tested on dummy head filled with electrolyte solution – not tested for children – human body being naturally electrical was not taken into account – only tested for increase in heat
WIRELESS TECHNOLOGY CONCERNS

Andrew Michrowski, Planetary Association for Clean Energy

Environmental wireless emissions geography, Salt Lake City. Paul M. Torrens, Geography, Arizona State University