True or False?

Antennas near Schools

Wi-Fi routers

We don’t believe in putting antennas near schools, so why are we so willing to put antennas inside schools? That’s right. Wi-Fi routers are microwave antennas.
Microwave Ovens

One type of microwave radiation we are all familiar with is the microwave oven.

What do microwave ovens and Wi-Fi routers have in common and how do they differ? Both use the same frequency, and both have the same wavelength. These are the ideal conditions for heating water. They differ in that Wi-Fi routers use a much lower intensity of radiation and the radiation is not contained and it consists of pulsed waves rather than continuous waves (more about that later) and the Wi-Fi Router is ON all the time. For these 3 reasons we should be concerned about placing Wi-Fi routers inside schools and inside our homes.
Let’s have a microwave cooking lesson. We can bake a potato in a microwave oven set at 100% power within 6 minutes. If we reduce the power to 50% it will take twice as long, or 12 minutes, to bake the potato. This is called the time-weighted exposure. Now, let’s replace the potatoes with students and the microwave oven with a school. Students in school are exposed to microwave radiation for 6 h/d, 5 d/wk for 40 w each year. That comes to 1,200 hours a year. After 10-years they are exposed to microwave radiation for 12,000 hours! Let’s put these 12,000 hour into perspective.

The INTERPHONE study, one of the largest and most expensive studies on the link between mobile phones and brain tumour risk, was published in 2010.
The INTERPHONE study showed that adults who used a cell phone for more than 1,640 hours over a 10-year period had a 40% increased risk of developing a brain tumour, called a Glioma. How does this exposure compare to Wi-Fi in schools? It is MUCH less, in terms of duration, and yet we are told to believe that Wi-Fi in schools is safe?

Here we have the electromagnetic spectrum that organizes electromagnetic energy according to frequency and wavelength, with low frequencies at the bottom and high frequencies at the top of this chart. Scientists have given names to different parts of the spectrum that have similar characteristics. At the bottom we have extremely low frequency electromagnetic fields. Then we have a band called radio frequency radiation that overlaps with microwaves and radar. Wi-Fi fits into this category at 2.4 GHz. At even higher frequencies we have ionizing radiation that is known to be carcinogenic. Both radio frequency and extremely low frequency fields are classified as possibly carcinogenic by the WHO.
Electromagnetic Spectrum:
visible light . . . microwaves

Light
Cosmic
Gamma
X-ray
UV
Infra Red
Microwave
Radio
ELF

transmit
reflect
focus

Microwave

A metal filing cabinet (as well as other metal objects) can either decrease or increase your exposure to Wi-Fi radiation depending on its location relative to you and the router. Taking a measurement in the middle of the room will NOT give the same reading as taking a measurement near a metal object, near your computer, or near the router.

Light is part of the electromagnetic spectrum and microwave radiation has many of the same characteristics as light. For example, light can be transmitted through windows; reflected or focused by mirrors and glass, and absorbed by dark colors. Similarly, microwaves can be transmitted through buildings, reflected and focused by metal, and they can be absorbed by water and fat. That is why we can cook a potato in a microwave oven but we can’t cook dry rice.

True or False?
Levels of microwave radiation in a room are uniform.
Metal objects on or in your body will also reflect, block or focus microwave radiation. That is why some sensitive people are unable to wear jewelry. A student with a mouth-full of metal braces standing near a router is likely to have higher radiation exposure in the head than a student without braces.

This graph shows altitude above sea-level. Ionizing radiation is largely absorbed by the upper atmosphere and very little reaches the earth’s surface. The same is true for infra-red radiation. Both light and radio frequency radiation reach the earth’s surface. So we are exposed to radio frequencies coming from outer space but these sources are VERY weak. That is why we need large radio telescopes to detect the energy. These microwaves are like whispers from outer space. A cell phone within 10 km of one of these receivers is similar to a shout and would interfere with the signals coming from space. That is why radio telescopes often have an exclusive zone surrounding them to minimize this manmade interference.
True or False?
Our exposure to microwaves is increasing exponentially.

1939  military RADAR  ~70 years
1967  radar range (microwave oven)  ~40 years
1984  cell phones & towers  ~30 years
2000  campus-wide Wi-Fi  ~10 years
2004  Wi-Max  ~7 years
2008  Wi-Fi in schools  ~3 years
2010  Smart Meters  ~1 year

In 1939, we had the first radar exposure of the military. In 1967, the radar range or microwave oven was introduced. In 1984, we were introduced to cell phones and the cellular antenna system. In 2000, we had our first exposure to campus-wide Wi-Fi. In 2004, we had the first Wi-Max operating. This is now called LTE an acronym for Long-Term Evolution also for Long-Term Exposure. In 2008, schools began to install Wi-Fi routers. In 2010, smart meters began to be placed on homes to record electricity, water and gas consumption. So most of our exposure to radio frequency microwaves dates back 30 years.

Here are some of the major changes in our exposure. 1. In the past our exposure was intermittent. Today it is constant. 2. The radiation is no longer restricted to military bases and airports. 3. Today we have transmitters inside our home. In the past, exposure was limited to a few occupations. Today, infants & children are exposed.
We can use the flood analogy to describe the increasing levels of microwave radiation. Low levels have no effect. But as the level rises a few people are adversely affected. Those below the line have become electrosensitives. As the level continues to increase, more people will be adversely affected.

We don’t know all the reasons why pulsed radiation is more harmful than non-pulsed radiation, but one reason is the way it’s measured. At the bottom we have radiation that is not pulsed. The maximum value and the average value are quite similar. With pulsed radiation the maximum or peak value is much higher than the average value and since many health authorities measure only average values they underestimate exposure considerably.
The **intensity** of radio frequency radiation can be measured using **power density**. **Guidelines** in various countries differ 5-orders of magnitude or by a 100,000 units. This is unheard of for chemical toxicants and for **ionizing radiation** where standards **globally** are quite similar. The **worst** guidelines are in the UK but Canada and the US are not far behind. Guidelines for Russia and Switzerland are at least 100 times more protective. These guidelines are **NOT effective** because **adverse effects** occur at much lower levels of exposure, as shown in red.

Indeed this is how some companies advertise their powerful wireless routers!
Wi-Fi base stations or routers in schools have multiple antennas (shown in blue). These antennas emit a beacon signal (shown in red). The routers are placed at various locations as shown in this floor plan. Each router emits microwave radiation that is always on. With multiple routers the entire school is blanketed with microwave radiation.

Once the computer disconnects from the Internet, the only remaining radiation is from the router. So the placement of these routers is critical. They should be well marked and in plain site, as far away from people as possible.
And the **closer** students are to each other, the **higher** their **exposure**.

The **U.S. Air Force** completed a study in **1984** at a cost of **$4.5 million** dollars. They exposed rats to **pulsed** 2450 MHz frequencies, which is **Wi-Fi**, at levels **well below** federal guidelines, for **21.5 h** daily for **25 months**.
The results were published in 1992 and became available on the Internet in 2005.

The results show that rats exposed to microwave radiation had more B-cells and T-cells. These cells are part of the immune system and become activated when the body detects unhealthy bacteria. The t-cells alert the b-cells that, in turn, produce antibodies to attack the bacteria. What is unusual, is that this experiment was conducted under sterile conditions. That is one reason it cost so much money.
Even more disturbing results were the effects on tumor growth. Three types of tumors were identified in various organs: benign, primary, and metastatic tumors.

A summary of the results are shown here, in Table 2.
What are the effects of long-term exposure to low-levels of **pulsed 2.45 GHz** (Wi-Fi)?

<table>
<thead>
<tr>
<th>Tumours</th>
<th>Exposed</th>
<th>Sham</th>
<th>increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign</td>
<td>62</td>
<td>53</td>
<td>16%</td>
</tr>
<tr>
<td>Metastatic</td>
<td>36</td>
<td>18</td>
<td>100%</td>
</tr>
<tr>
<td>Primary</td>
<td>18</td>
<td>5</td>
<td>260%</td>
</tr>
</tbody>
</table>

And effects on the **immune system**. Is this what we want to expose **students** and **teachers** to for **6 hours** each **school** day?

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The **World Health Organization** classified radio frequency electromagnetic fields as **possibly carcinogenic to humans**. They based their conclusions on **rat studies** and studies of people who use **wireless phones** and studies of people who **live near antennas**. In their press release because they mentioned **gliomas** and **wireless phone**, some—**falsely believed**—that **only** cell phone radiation was potentially carcinogenic and that we didn’t **need** to be concerned about **other forms** of radio frequency radiation. But this is **not** the case! **Wi-Fi** radiation is a **possible human carcinogen**.
"In the interest of occupational hygiene, many Soviet investigators (and at least one U.S. researcher) have recommended that cardiovascular abnormalities be used as screening criteria to exclude people from occupations involving radio-frequency exposures."

Let’s look at other effects of pulsed microwave radio frequency radiation.

Studies on the health effects of microwave radiation go back decades although some of the earlier studies were classified. Read what the authors write in this symposium proceedings that was published in 1969. Scientists knew 42 years ago that RFR affects the heart!
This was a **double blind** study that has been published in a **peer-reviewed** journal. **Subject A** was wearing a heart monitor and was exposed for **three** 3-minute periods to radiation from a **cordless phone** or to **sham** exposure. The heart rate remained relatively **constant** 58, 56, and 58 beats per minute. This subject was exposed during the **second time-interval** but does **not** respond to the provocation. Subject A is **non-responsive**. **Subject B**. has a **rapid** heart rate during intervals 3 and 5, which **coincide** with **exposure** to the **cordless** phone. This subject experienced **tachycardia**, a rapid heart rate, and is **highly reactive**. Exposure was at levels **less than 1%** of Health Canada’s safety code 6.

**True or False?**

Radiation from a **2.4 GHz** (cordless phone) **affects** the heart.

- **Subject A**
  - **pre-exposure**
  - **2.4 GHz**
  - **sham**
  - **58 bpm**

- **Subject B**
  - **sham**
  - **2.4 GHz**
  - **sham**
  - **2.4 GHz**

**tachycardia . . . 0.3% of SC6**

**True or False?**

Students experiencing heart irregularities at school

- **Student with heart monitor.**

**Mountain View School:**
1. 6-year old girl, “musical heart”, headaches, dizziness only at school.
2. 12-year old boy, tachyardia.
3. 12-year old girl, nausea, vomiting, no fever, insomnia, blurred vision, tachycardia (only at school).
4. 13-year old boy, heart pounding, insomnia, headaches, moved & symptoms abated.

Several students have visited their **pediatric cardiologist** and have worn **heart monitors** to school. Here are the symptoms they experienced.
World famous cardiologist, Dr. Stephen Sinatra, explains what may be happening to these students. As many as 1/700 kids may have Wolf-Parkinsons-White syndrome. In a school district of 50,000 students that means as many as 70 students may have WPW syndrome, which could lead to irregular or rapid heart rate brought on by Wi-Fi radiation. Some have supraventricular tachycardia and are also at risk of heart problems if exposed to microwave radiation. To view video: http://www.youtube.com/watch?v=RL7VciHDDI0

The slide on the left shows what my blood looks like in a clean electromagnetic environment. Most cells are separate and a few cells are sticking together. The right slide shows what my blood looked like after I used a cordless phone for 10 minutes. My blood cells are sticking together. This is called rouleaux formation and shows an unhealthy condition.
The **consequences** of rouleaux formation and the symptoms are shown here. These symptoms are the **very same symptoms** experienced by people who are **electrically sensitive** and by some **students** at Mountainview school as shown in the following video.

<table>
<thead>
<tr>
<th>Consequences</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>➤ headaches</td>
</tr>
<tr>
<td></td>
<td>➤ fatigue</td>
</tr>
<tr>
<td></td>
<td>➤ difficulty concentrating</td>
</tr>
<tr>
<td></td>
<td>➤ numbness, tingling</td>
</tr>
<tr>
<td></td>
<td>➤ dizziness, nausea</td>
</tr>
<tr>
<td></td>
<td>➤ weakness</td>
</tr>
<tr>
<td>✓ lower oxygen transport</td>
<td></td>
</tr>
<tr>
<td>✓ reduced waste removal</td>
<td></td>
</tr>
</tbody>
</table>

Some students at Mountainview school are complaining of poor health only while at school. Mountainview school has Wi-Fi installed. To view this video, go to http://www.youtube.com/watch?v=h-TJXRc5fzo
RESULTS: Our results showed decrease progressive sperm motility (73.5 ± 8.2 vs 63.6 ± 7.3; p < 0.05), increase sperm immotility (18.8 ± 6.9 vs 28.3 ± 7.3; p < 0.05) and increase of sperm DNA fragmentation (6.3 ± 8.1 vs 13.1 ± 9.2; p < 0.05) in the exposed group vs non exposed. Levels of non progressive sperm motility and vitality did not show significant difference between the two groups.

5. CONCLUSIONS

All the observed levels are far below exposure limits currently established or proposed by major international or national agencies or organizations for public (including children) or occupational exposures.

Dr. Tony Muk was asked by the Superintendent of Education to measure two schools in Ontario. The testing was completed in November 2010 and was released February 2011. The conclusions in this report are WRONG as shown in following slide.
1. Results from readings in two Ontario Schools, Tony Muc (previous slide).  
2. In an Ontario classroom with no router and no computer the level of radiation was very low (0.01 microW/cm²). With one computer accessing the Internet radiation jumps to 12.5 units and with one cell phone accessing the Internet it jumps to 40 units.  
3. In a classroom with one router radiation levels are much higher even though no one is accessing the Internet!  
4. In a Vermont classroom, the levels of radiation were almost the same as the levels 100 meters from a cell tower! Levels near the laptop and near the router were even higher.  
5. Several studies have documented adverse health effects experienced by people who live near cell towers. Here are a few that provide exposure levels. The levels at which people experienced symptoms of electrosensitvity, cancer, immunological effects, neurological effects, reduced sperm count are shown by red arrows. Yet we are told that levels in the classroom are too low to have any adverse effects!
Cell phone antennas should not be placed near schools and Wi-Fi routers should not be placed inside schools.

### Options

**WORST** - Wi-Fi everywhere & always on . . . not a good option!

**BETTER** - Modified Wi-Fi - limit locations, limit time of use, adjust behaviour.

**BEST** - Wired Connections.

So what are the options? The worst option is the one that most schools are using. Wi-Fi everywhere, always on. This is a high tech and low intelligence option. A better option is the modified Wi-Fi. Here schools limit the location and the time of use, and adjust behavior. The best option is a wired connection, which is both high tech and high intelligence.
The Parliamentary Assembly Council of Europe agrees about wired connections for Internet access in schools.

There are three wired alternatives to wireless. **Ethernet**, which many schools already have, so the Wi-Fi is redundant. **Fiber optics**, which is perhaps the best option, but makes sense only if there is fibre optics in the community. Otherwise it is **too expensive** for most schools to afford.
The third option is the **powerline adapter**. Several makes are available. Basically you purchase **two** adapters; one connects to the **router** and the other connects to the **computer**. Both have an **Ethernet** port and both are **plugged** into an **electric outlet**. These adaptors convert the wiring in a building to an Ethernet connection. Each computer needs its own powerline adaptor. This method is **faster** than Wi-Fi, more **secure**, more **energy efficient**, less **expensive**, and – best of all – it does **NOT** emit microwave radiation.

1. Wi-Fi radiation promotes **tumors** in rats, 2. It affects **sperm** mobility and damages sperm **DNA**, 3. It causes **rouleaux** formation of the blood, 4. It may cause **heart irregularities** in as many as **1/700** students, 5. It causes **arrhythmia** and **tachycardia**, 6. It damages the **heart**, 7. It contributes to **headaches**, dizziness, nausea, weakness and concentration problems, 8. If half an hour a day exposure to cell phones contributes to brain tumors can we be so sure that 6 hours of exposure to Wi-Fi in school is safe? 9. How much confidence do we have in the system when exposure exceeded guidelines in one school where the students are complaining of headaches and heart problems and nothing has been done about it.
In the end . . .

All truth goes through three stages.
• First it is ridiculed.
• Then it is violently opposed.
• Finally, it is accepted as self-evident.

-Schopenhauer

can we afford to make mistakes?

"Our lives begin to end the day we become silent about things that matter."

- Martin Luther King, Jr.

If you care about the health of students & teachers, share this pdf.
• And, if you have Wi-Fi at home, consider replacing it with a wired connection.
• Ask your neighbors to do the same.

www.safeschool.ca
www.magdahavas.com

If you would like to watch this as a video, go to http://www.youtube.com/watch?v=6v75sKAUFdc or search for Dr. Magda Havas: WiFi in Schools is Safe. True or False?