

Wi-Fi in Schools: Experimenting with the Next Generation

Commercial wireless systems expose children to nation's highest radiation levels

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The internet has unleashed human knowledge. Never before has it been so easy to learn so much. Of course, it has also drowned us in distraction and created a breeding ground for trolls and misinformation, but if the internet is redeemed by anything, it is its liberation of education.

When it comes to accessing this ocean of information, we have two basic choices: wired or Wi-Fi. The vast majority of schools have embraced the wireless revolution. It's easy to see why. Compared to wired internet, wireless is simpler, cheaper, and faster for schools to install.

Today, students are trading notebooks and textbooks for laptops, cellphones, iPads, and all manner of "smart" devices connected to a potent wireless infrastructure that lets them be used virtually anywhere on school grounds.

But that wireless web comes with a devastating downside. Doctors and scientists say that the students and teachers who attend these schools are risking their health.

Radiation Dangers

Dr. Martin Pall, Professor Emeritus of biochemistry and basic medical sciences at Washington State University made a grave case about the dangers involved in his paper, ["Wi-Fi is An Important Threat to Human Health,"](#) published in the July 2018 issue of Environmental Research.

"The placement of Wi-Fi into schools around the country may well be a high-level threat to the health of our children as well being a threat to teachers and any very sensitive fetuses teachers may be carrying, as well," Pall writes.

Since Wi-Fi is found everywhere from private homes to public spaces, Pall's alarming claim seems hard to fathom. And yet his evidence is compelling: 23 controlled scientific studies demonstrating numerous adverse effects to Wi-Fi radiation exposure. And that's just the tip of the iceberg—there are dozens more studies on Wi-Fi harms which were not included in the paper.

Wireless radiation has become commonplace despite well-documented evidence of its harm, with thousands of studies going back several decades demonstrating health problems

associated with exposure. Some of the strongest evidence came last year from the final report of a \$30 million, 19-year [study](#) funded by the U.S. Food and Drug Administration. It was conducted by the National Toxicology Program (NTP)—the federal agency tasked with testing toxins—and was designed to be the [final word](#) on whether wireless radiation was harmful. It showed clear evidence of cancer and DNA damage linked to cellphone use.

Concentrated Risk

Schools are particularly worrisome, experts say, because they are where the most intense concentration of wireless radiation is found today. The Wi-Fi systems schools have adopted are much more comprehensive than your average home or coffee shop Wi-Fi. These commercial grade systems use several routers or “access points” throughout the classroom, often in the ceiling above students’ heads. Now, add in all the radiation spewing from all the wireless devices operated by each student, and you’ll find that kids are spending up to seven hours per day in a thick soup of electro-smog.

Even worse, the people we place in this remarkably concentrated field of wireless radiation are more [vulnerable](#) to it. Compared to adults, children are smaller and have smaller and thinner skulls so the radiation penetrates more easily and gets to larger parts of the brain. Also problematic, children’s immune and nervous systems are still developing. Plus, kids’ cells divide at a faster rate, which increases the risk for mutations that can lead to cancer.

According to Pall, these factors make children more susceptible to the disease processes that wireless radiation has been consistently shown to cause: oxidative stress (which can lead to cancer and non-cancerous conditions, as well as DNA damage), sperm and testicular damage, neuropsychiatric effects, cell death, changes to the endocrine system, and calcium overload.

Evidence of Illness

These disease processes aren’t merely theoretical. Epidemiological studies conducted by Dr. Lennart Hardell, an oncologist at Orebro University Hospital in Sweden, showed that children exposed to this radiation are [more likely to develop cancer](#) and develop it quicker.

Other doctors and scientists say exposure is likely a significant contributing factor to the rising rates of other childhood diseases. [Dr. Hugh Taylor](#), a professor and chair of obstetrics, gynecology, and reproductive sciences at Yale University, has shown that fetal exposure to wireless radiation affects neuro-development and behavior and can lead to Attention Deficit and Hyperactivity Disorder (ADHD)— a condition that has doubled in the past 10 years.

Harvard Medical School professor and a pediatric neurologist at Massachusetts General Hospital, [Dr. Martha Herbert](#), makes a compelling argument that the rise in autism spectrum disorders may also be related to our rise in wireless radiation exposure.

Herbert’s 60-page [report](#) from 2012 doesn’t provide evidence of cause, but it does reveal several similarities between symptoms known to occur with wireless radiation and biological manifestations in autism, such as cellular stress, tissue damage, protein misfolding, and injury of membranes.

Herbert describes autism, not as a condition of a broken brain, but of a brain that has a hard time regulating itself. And she believes that if such a brain is caught in a cloud of wireless radiation, it is confronted with a disruptive factor, making it even harder for behavior and

biology to come into balance.

While the brains of children with autism may be most vulnerable to microwave radiation, Herbert says every brain is at the mercy of its influence.

“I really am concerned about people’s brains,” Herbert said. “It’s not a joke to have this stuff getting into these three pounds of delicate, gel-crystalline structure in our heads that does this amazing stuff. It wasn’t meant for this level of exposure.”

Electromagnetic Neurology

Herbert explains that, just like our wireless devices, our brain communicates with electromagnetic signaling. In fact, as our instruments have become more sensitive, scientists have discovered that each cell in our body uses electromagnetic signaling.

Now that we live in a wireless world, where we all walk around in a field of electromagnetic radiation nearly all the time, Herbert believes there is enough scientific support to argue that this influence could be an important contributor to degrading the optimal chemical-electrical function of our bodies—thereby detuning our brains and nervous systems.

Autism was once considered strictly a genetic abnormality. But as knowledge of the condition has grown, researchers have uncovered a more complex landscape, where a host of environmental influences have shown an impact on gene expression.

This means that instead of one smoking gun tied to this fast growing condition (the latest estimate from the Centers for Disease Control is that one in every 40 children has autism, up from one in every 166 in 2005), there are likely many factors. Toxic chemicals, for example, have long been demonstrated to impact fetal brain development.

But Herbert argues that, due to electric nature of our bodies, wireless radiation may create more of a disruption than toxic chemicals.

“When you have a toxicant exposure, it can affect the brain, but it has to go through metabolic pathways that can influence the electromagnetics in order to do that,” Herbert said. “But when you have electromagnetic radiation, it’s a straight shot. It’s the same language, so it can be more instantaneous.”

Sick in Schools

Dafna Tachover is a former telecommunications officer turned lawyer who [advocates](#) for people harmed by wireless radiation. Her Supreme Court lawsuit in Israel led to the first limits on Wi-Fi in schools worldwide. Tachover showed evidence of 200 sick children from the Wi-Fi in just six schools.

Now in the United States, Tachover says she is contacted by several parents every week with children who have become sick from their school’s wireless system. She says the most common symptoms include headaches, increased sensitivity to noise, nose bleeds, concentration and memory problems, nausea, exhaustion, and hyperactivity.

“Unfortunately, these harms are not potential but existing, and at an epidemic scale,” Tachover said.

The acute or chronic illness that results from wireless radiation is known as [electromagnetic sensitivity](#). It’s the same illness the U.S. Navy dubbed “microwave sickness” when soldiers who had been working with technologies such as radar for extended periods of time displayed the same symptoms. The illness is named for the microwave frequencies that powers wireless technology. Those who contract microwave sickness can’t be in the presence of wireless radiation without painful and sometimes debilitating symptoms.

One child Tachover is working with is a 13-year-old girl from Oregon whose desk was directly under the classroom’s Wi-Fi router. After she developed microwave sickness, her parents enrolled her in a private Waldorf school, because they’re one of few schools that don’t use Wi-Fi.

In some cases, parents are forced to homeschool their children because they can’t get access to schools without Wi-Fi. In other cases, sick kids are forced to make do.

Tachover said one parent had two sons who developed microwave sickness. This mother urged her sons’ school to accommodate by hard wiring the classroom internet and even offered to pay for the accommodation, but the school refused. As a result, her children can only attend school for a few hours per week.

“When in the Wi-Fi environment they experience headaches, concentration problems, skin rashes and hyperactivity,” Tachover said.

Risk to Teachers

Microwave sickness can impact teachers who work in Wi-Fi too. Laurie Brown, a teacher in the Los Angeles Unified School District (LAUSD), says she knew nothing about the health impacts from wireless until her school installed a commercial grade Wi-Fi system in April of 2015. Today, she says the damage caused by this technology is impossible for her to ignore.

“We had Wi-Fi before, but the upgraded system now had two access points in every single classroom, adding a total of 190 access points to the school, including additional boosters to prevent any loss of connectivity,” Brown said. “All of this was for Common Core testing, and 21st-century teaching.”

During Common Core testing, each of Brown’s students used a wireless laptop (Chromebook) to access this new system. After just two hours in this new high tech environment, Brown started feeling several symptoms: tingling and burning in her skin, breathing problems, and a rising heart rate. Her ankles started itching and her nasal passages started to swell.

Symptoms grew worse and soon Brown could barely make it through the day. Before the new Wi-Fi system, Brown was rarely sick and had saved close to 800 hours of time off for illness. But after the installation of the new equipment, she was sick all the time. By the end of the school year, Brown was out at least two days every week.

"I just started to feel horrible," she said. "I would go home from school feeling so lousy. I was never a headachy person, and I was getting all these headaches that were so strange."

Brown knows of at least 10 teachers and staff members who complained of symptoms that they traced to the school's Wi-Fi. Two retired, one from another school resigned, and at least three (including Brown) filed for workers compensation injuries with the LAUSD. All the claims were initially denied.

Brown is now on disability leave, but she would rather have her old life back. Today, if someone is just using a cellphone near her, Brown's inflammatory symptoms, as well as other sometimes debilitating symptoms, can quickly return.

"It's overwhelming and it's sad because it takes away from the enjoyment of life and your lifestyle," she said. "I'm someone who is accommodating, likes to please and is easy going. I wasn't a high maintenance person. It makes me feel uncomfortable in my own skin to feel like I'm inconveniencing others."

For schools that are willing to make accommodations, lives have been turned around. Appeals through the American with Disabilities Act have made some schools remove the Wi-Fi routers in the classrooms where there are microwave illness sufferers, even extending the router removal to neighboring classrooms when they still exert an influence.

Teacher Sheila Reavill contracted microwave sickness but she convinced her school to hardwire their internet access and connect laptops with an adapter. There is no Wi-Fi or Bluetooth in Reavill's class, and the children who carry cellphones shut them off when they're in the room.

"She says she not only she feels better in the classroom, but her students are also calmer and can focus better," Tachover said.

Experts [saw dangers](#) in school Wi-Fi upgrades even before they were installed. In 2013, Herbert wrote a [warning letter](#) to the LAUSD, citing the thousands of papers that have accumulated over decades which document adverse health and neurological impacts of electromagnetic frequency and radiofrequency radiation (EMF/RFR).

"EMF/RFR from Wi-Fi and cell towers can exert a disorganizing effect on the ability to learn and remember, and can also be destabilizing to immune and metabolic function," Herbert wrote. "This will make it harder for some children to learn, particularly those who are already having problems in the first place."

The letter went viral, but the school district paid it little mind.

"You know who did react? The firefighters," Herbert said. "They had this boondoggle going where they were putting cell towers right behind all the fire stations. So guess what? All the firefighters were getting sick."

As more people become aware of the dangers associated with wireless radiation and Wi-Fi in schools, efforts are emerging from [teachers unions](#), [parent organizations](#), and [physician groups](#) to address the problem.

One widely proposed solution is for schools to adopt a wired system. This would allow students to have more reliable high-speed internet access but without the microwave radiation. The cost would only be slightly higher than a wireless system.

While installing a wired system would mean a greater cost up front, it could save schools millions in the long run, as well as ensuring the health of the children who attend these schools. Tachover says that most schools are not insured for health effects related to wireless radiation because most insurance companies learned their lesson from tobacco and asbestos and have made an exclusion with regard to wireless.

Some change may come in the form of new laws. In Massachusetts, seven bills have recently taken aim at the issue of wireless technology in a handful of schools.

Deb Mayer runs the Oregon chapter of [Parents Across America \(PAA\)](#). She says her organization has introduced [three bills into the state legislature](#) that target children's increasing exposure to wireless radiation.

"We aren't against technology. We're against unsafe use and irresponsible use," Mayer said.

One bill allows Wi-Fi wary parents to choose an alternative for their child. The bill also calls for kids to have recess so they get a chance to move around in the physical world for some part of their day.

The second bill focuses on better public understanding of the biological impact of wireless. It requires public and private schools to distribute information about the potential health risks of wireless network technology to employees, students and parents or guardians. It would also require the state's Health Authority to examine peer-reviewed, independently funded studies on the effects of exposure to microwave radiation in schools and similar environments, particularly exposure that results from the use of wireless network technologies. It then calls on the Health Authority to create guidelines based on this review.

The bill that Mayer believes has the best chance of passing is one which calls for something wireless manufacturers already do, but writ large. Buried deeply in your cell phone manual are tips about using your device more safely. The bill asks to have these tips more explicit with clear warning labels so that consumers take safety more seriously.

Overall, that's the biggest challenge—getting schools, lawmakers, and the public to treat the issue with the gravity it deserves.

"Getting people to believe that what we say is real and true is really a heavy lift because they don't want to think there is a downside to their devices," Mayer said. "And they especially don't want to think that giving devices to their kids is a bad thing to do."

Herbert says another reason why people may be resistant to see this problem is that all this

wireless radiation may be affecting our judgment.

“Your judgment is intrinsically off when your brain function is altered in some way. You could be missing things—missing distinctions, or being disorganized in ways you don’t realize until you come out of it. Maybe you never come out of it,” Herbert said. “Just something to contemplate as we try and look at our increasing exposure to electromagnetic waves.”

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