

FCC 12-152

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)	
)	
Notice of Proposed Rulemaking)	
18 FCC Rcd 13187, 13188 ¶1 (2003))	ET Docket No. 03-137
)	
And)	
)	
Service Rules for the Advanced Wireless Services)	WT Docket No. 12-357
H Block---Implementing Section 6401 of the)	
Middle Class Tax Relief and Job Creation Act of)	
2012 Related to the 1915-1920 MHz and)	
1995-2000 MHz Bands ¶53 footnote 95)	

To: Office of the Secretary
Federal Communications Commission
Washington, DC 20554

Comment Filed by: Linda Kurtz
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February 3, 2013

AFFIDAVIT OF LINDA KURTZ

State of Michigan]

Washtenaw County]

I, Linda Kurtz, attest that the statements below are true to the best of my knowledge.

Comment round for ET Docket No. 03-137 and WT Docket No. 12-357.

1. My name is Linda Kurtz. My address is 2150 Foss St., Ann Arbor, MI 48103.
2. I am a massage therapist and editor.
3. I am submitting this testimony on behalf of Leslie Panzica-Glapa, who, through me, submitted testimony in Michigan Public Service Commission Case U-17053.
4. Ms. Panzica-Glapa's minor son has experienced documented endocrine abnormalities that immediately followed the installation of a smart meter on his family home. Ms. Panzica-Glapa has suffered terrible health effects since the installation of a wireless digital meter on her home.

QUALIFICATIONS OF LESLIE PANZICA-GLAPA

1 **Q. Do you swear that the testimony you are about to give is the truth, the whole truth,**
2 **and nothing but the truth?**

3 A. I do.

4 **Q. Please state your name, address and contact information.**

5 A. My name is Leslie Panzica-Glapa. I live at 8010 Base Lake Drive, Dexter, Michigan 48130.
6 My telephone number is 734-904-1826.

7 **Q. On whose behalf are you testifying?**

8 A. That of Intervenors Linda Kurtz and Cynthia Edwards.

9 **Q. What are your qualifications to testify?**

10 A. I take my electric service from Detroit Edison. I have been affected by the smart meter
11 installation both in terms of my health and in terms of earning an income.

DIRECT TESTIMONY OF LESLIE PANZICA-GLAPA

1 **Q. What is the purpose of your testimony?**

2 A. To provide information that establishes that there is a need for a no-fee opt-out and the
3 need for an analog meter option. To provide information that may help the Commission in
4 determining whether smart and digital meters create certain kinds of economic, medical,
5 social, or other harm or hardship, as outlined in Intervenor Linda Kurtz's Petition for
6 Intervention, to some or all persons such that Detroit Edison and the Commission must not
7 require those who are or who are likely to be so harmed to have a smart or digital meter
8 placed on their home or place of business or to be otherwise deprived of rights and liberties,
9 as outlined in Intervenor Kurtz's Petition for Intervention, by the deployment of the
10 advanced metering infrastructure, smart meters, or digital meters, and, in the alternative,
11 that such persons must be able to avoid such harm to their person and property without
12 being charged a fee.

13 **Q. How long have you lived at your current residence?**

14 A. I have lived in my home since 1981, for 31 years. I own my home.

15 **Q. What do you do for a living?**

16 A. I worked as a mail carrier for 18 years. For the past 13 years I have worked as a landscaper.

17 **Q. When was a smart meter installed on your home?**

18 A. July 18, 2012.

19 **Q. Did you know it had been installed on your home?**

20 A. No, I didn't. Later, when I couldn't sleep, I called DTE, and they told me the date it had been
21 installed.

22 **Q. Something led you to call DTE. What was that?**

23 A. Never in my life have I had a problem sleeping. "When my head hits the pillow," as the
24 saying goes, "I'm out like a light." But now I was lying awake for hours without falling
25 asleep, night after night. 12 am, 2 am, 4 am, I'm still awake! I wondered, "What's going on?"
26 I talked to a friend, telling him my dilemma, and he told me that the smart meters could
27 alter your sleep. "What are smart meters?" I asked. I had never heard of them.

28 **Q. So prior to your conversation with your friend, you knew nothing about smart
29 meters?**

30 A. No.

31 **q. So you weren't anxious about smart meters and thus experiencing insomnia?**

1 A. No. Like I said, I had never heard of them before. Like I said, my entire life, I have slept like a
2 rock—that is until a smart meters was installed on my home.

3 **Q. Prior to talking to your friend, did you know that a smart meter had been installed**
4 **on your home?**

5 A. No. I was never contacted or asked if this meter could go on my home. After I talked to my
6 friend, I went to look to see if a smart meter had been installed on my home. It had been. I
7 contacted DTE immediately, this was some time in August, asking them to take this meter
8 off my house. They said I was the first person to call and complain about the smart meter
9 causing any problems. The representative said she was sure I must have had problems
10 sleeping before.

11 **Q. What did DTE tell you they would do?**

12 A. They said they could not take the meter off my house and at this time there was no opt-out
13 program but they were working on it.

14 **Q. What did you do next?**

15 A. I continued to call and call and call them and said, “Please take this meter off my house. I
16 can’t sleep, I can’t work.” I called at 3 a.m. one night when I couldn’t sleep. Like the first
17 representative, this representative said he’d never heard of such a problem. I finally set up
18 a tent in my backyard, after weeks of not sleeping. I slept really well, not quite as well as
19 when I was sleeping in my own bed in my own home before I had a smart meter, but no one
20 sleeps quite as well in a tent as in their own bed. It has been very stormy and windy this
21 last month, and about three weeks ago the tent blew over on me at about 3 a.m. It covered
22 me so thoroughly, and was so heavy, I thought I was going to suffocate!

23 **Q. Did you continue to sleep in the tent?**

24 A. I moved back into my house because every time I set the tent up, it blew back down the
25 winds were so high. My nights are now sleepless.

26 **Q. Do you experience any other health problems or symptoms from the smart meter?**

27 A. At night, I lie there feeling a vibration going through all of my body and my ears ring loudly.
28 Landscaping is really hard work, and I wonder some days how I am going to make it. The
29 sleep deprivation makes me extremely fatigued and worn out. Day after day after day of
30 exhaustion has made me feel suicidal at times. I just don’t know how I can keep going on! I
31 have felt such a fatigue and depression. This is totally affecting my personality and thus my
32 friendships and other relationships. This is affecting my productivity at work – I am so
33 tired! My memory has been affected – I will be talking to a person and totally go blank and
34 can't finish my sentence. I have pain in my body I haven't had before—I feel an achiness
35 around my joints. This has been progressive. In the last two days, I have begun feeling an
36 achiness around the vertebrae in my back.

1 I feel a physical agitation in my body. I work outside all day. I come home, and within a
2 couple hours, I feel so agitated in my body. When I was able to sleep in my tent, I would look
3 so forward to going outside. People would say, "Leslie, you can't sleep out there, it's so cold."
4 And I would be so happy because I didn't feel that agitation outside and I could sleep.

5 I experience ringing in my ears whenever I am in any building with a smart meter. At one
6 client's house, the ringing in my ears was so loud I couldn't believe it. Buildings with
7 fluorescent lights are particularly bad.

8 **Q. How do you know it is smart meters that are affecting your health?**

9 A. I know because I never had a problem before smart meters.

10 **Q. Did you have any health problems prior to the installation of smart meters? If so,
11 what were they and when did they begin?**

12 A. Hypothyroidism. This was diagnosed about twelve years ago.

13 **Q. Does this cause fatigue?**

14 A. No, because I take medication for it.

15 **Q. So could this be what is causing you to have trouble sleeping at night?**

16 A. No, because I never have had trouble sleeping, that is, not until the smart meters were
17 installed. The fatigue was caused by the hypothyroidism, not by lack of sleep.

18 **Q. Any other health conditions?**

19 A. I feel like some asthma, though it's never been diagnosed.

20 **Q. Have you had sensitivity to any other electrical or wireless devices other than smart
21 meters?**

22 A. Yes. I am extremely affected by my cell phone. I feel agitated when I am using it, and I have
23 ever since I got it five years ago. I have started to use the speaker phone rather than hold
24 the phone against my ear. That helps slightly.

25 **Q. You said you have contemplated suicide after experiencing day after day of unending
26 fatigue since smart meter installation. Have you every contemplated suicide prior to
27 this?**

28 A. Never. Definitely never. But after I was so exhausted after not sleeping for days, I was
29 going to work one day, completely exhausted. I thought, "How can anyone go on day after
30 day like this without sleeping?" I thought, "Now I know why people think about suicide.
31 People that don't sleep, how do they keep on going?"

32 **Q. Have the health effects you experience as a result of smart meters affected your
33 ability to work and earn a living? If the answer is yes, describe how.**

- 1 A. I have been late for work because I have needed to try to rest—I guess I can't really call it
2 sleep anymore. I've never actually missed work, but I have been late for work. My
3 productivity is less. I've never been late for work in the past.
- 4 **Q. Have the health effects you experience as a result of smart meters affected your
5 ability to interact socially with others? If the answer is yes, describe how.**
- 6 A. Yes. When you are so tired, you don't even want to socialize with anyone. I feel angry, so
7 fatigued. All I think about is sleeping.
- 8 It's negatively affected my most intimate relationship in the last few months. It's had a huge
9 impact. The lack of sleep has made me so fatigued and angry, and it's hard to love someone
10 when you feel that way.
- 11 **Q. Have the health effects you experience as a result of smart meters affected your
12 ability to access public services, such as the public library, government offices? If the
13 answer is yes, describe how.**
- 14 A. Yes, because going into any building with a smart meter, I feel agitated.
- 15 **Q. Have the health effects you experience as a result of smart meters affected your
16 ability to freely assemble outside? If the answer is yes, describe how.**
- 17 A. No.
- 18 **Q. Have the health effects you experience as a result of smart meters affected your
19 ability to access religious or spiritual services? If the answer is yes, describe how.**
- 20 A. My spiritual life is outside, so no, it hasn't.
- 21 **Q. Have the health effects you experience as a result of smart meters affected your
22 ability to freely access health services? If the answer is yes, describe how.**
- 23 A. No, but I haven't been to any health-care facility since smart meters were installed, except
24 for the UM, where they don't have smart meters. Given how I react in buildings with smart
25 meters, I expect that it will affect me once I do need to see a health-care professional who is
26 in a building with smart meters.
- 27 **Q. Have the health effects you experience as a result of smart meters affected your
28 ability to perform one or more major life activities not already mentioned? If the
29 answer is yes, describe what activities and how the effects have affected your
30 performance of these activities.**
- 31 A. Interacting with others. Reading, because I get so agitated in my body and I can't
32 concentrated. I used to love to read, and I kept wondering, "Why can't I read now." Inability
33 to think, concentrate, comprehend. Sleeping, obviously. Performing manual tasks because
34 being in the house is so hard—how can I clean my house, wash my dishes, etc when I just
35 need to get out of my house.

1 As far as physical labor goes, I am more tired, it's harder to be productive.
2 Breathing—it has been harder for me to breathe in the house. I have asthma.
3 My memory is a lot worse. I have to write everything down now. My son keeps telling me,
4 "Mom, I told you that yesterday."

5 **Q. Has your ability to live in your home been affected by the installation of smart**
6 **meters?**

7 A. Totally. I think that has been covered.

8 **Q. Is there anything else you wish to say about how smart meters have affected your**
9 **health and/or your life?**

10 A. Yes. My sixteen-year-old son, Drew, sleeps a couple feet away from the meter. He has
11 juvenile diabetes. We just went to see his endocrinologist, Dr. Gregg, at the University of
12 Michigan Mott's Children's Hospital on November 1. He's been going there for 2 years, since
13 his diagnosis when he was 14. There is this number called A1c. There's this blood test they
14 give the kids called A1C. It's a blood test that shows what his blood sugars combined were
15 for the last three months. His numbers were always below 7. His last appointment, they
16 were 6.8. [Exhibit 1.] The doctors have always been so happy because they want these
17 numbers to always be below 7.

18 I have Drew on a very clean, organic diet and he exercises playing hockey and lacrosse, all of
19 which help keep his blood sugars at a good level. On November 1, his A1c was taken, and the
20 level had shot up to 9.5. [Exhibit 1.] The doctor if anything had changed as far as his diet
21 and exercise. Nothing had. It's very clear that his blood sugar levels have shot up because of
22 the smart meters. Nothing else in his life has changed, and the levels have been consistent
23 for two years. There's no other explanation. When levels are above 7, it wreaks havoc on the
24 body. Many things can happen to the body, to his limbs, to his organ.

25 Dr. Gregg has sent a letter to DTE describing her findings and stating that the smart meter
26 needs to be taken off the home.

27 From a *Prevention Magazine* article that I read, I have learned that the EMFs emitted by
28 smart meters can elevate blood sugar levels. They discussed work by Dr. Magda Havas of
29 Trent University, whose research has shown that voltage transients can elevate blood sugar
30 levels of diabetics. [Attached as Exhibit 2. Pertinent area is on page 6 of Exhibit 2,
31 highlighted in yellow.]

Respectfully submitted,

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February 3, 2013

STATE OF MICHIGAN

BEFORE THE MICHIGAN PUBLIC SERVICE COMMISSION

In the matter of the application and request)

of the DETROIT EDISON COMPANY seeking)

approval and authority to implement its)

Case No U-17053

proposed Advanced Metering Infrastructure)

opt out program.)

EXHIBITS OF

LESLIE PANZICA-GLAPA

EXHIBIT 1

11/08/2012 16:40 FAX 7346153353

U OF M PED ENDO

001/006

Glapa, Drew Russell (MRN# 040245480) DOB: 01/09/1996

Printed 11/8/12 4:03 PM

Drew Russell Glapa
11/1/2012 8:00 AM Office Visit
MRN: 040245480

Description: 16 year old male
Provider: Brigid Ellen Gregg, MD
Department: Mh Ped Endocrinology

Diagnoses	Reason for Visit
Diabetes mellitus - Primary 250.00 Long-term insulin use V58.67	Diabetes Mellitus

Vitals - Last Recorded

BP	Pulse	Temp(Src)	Ht	Wt	BMI
114/61	58	97.7 °F (36.5 °C) (Oral)	1.816 m (5' 11.5")	68.8 kg (151 lb 10.8 oz)	20.86 kg/m2

Progress Notes

Brigid Ellen Gregg, MD 11/5/2012 8:38 AM Signed

Drew Glapa is a 16 year 10 month old boy who is seen in Pediatric Diabetes Clinic for follow-up of Type I diabetes. He was diagnosed with Type I diabetes in May 2010. He is accompanied by his mother.

MEDICATIONS:

Lantus 22 units at bedtime
Novolog: Insulin/Carb ratio 1:13 for breakfast, lunch, and dinner
correction 1:100>150 at breakfast and lunch

Other relevant medications: None

INTERVAL HISTORY: No interim illness. Over the summer they attended an intro to pump class. He said he was interested in the pump but never completed the workbook. They did not bring blood sugar log to review. He reports checking 3-4 times/day. He states that he has low BG in the 70's after hockey practice in the afternoon. He treats these with power bars, and we discussed the need for him to have a fast acting sugar with him. He will not have any periods where he is not in a sport from this point. He has is not driving often. Mother is very concerned that a smart meter placed on their home by the utility company over the summer has caused a worsening of his BS.

History of severe hypoglycemia: No.
History of significant # of (non-severe) hypoglycemic episodes: non-reported 2-3 per week.
Occasional 50-60 after hockey practice. He feels shaky and has a granola bar.
History of DKA: None since diagnosis
History of DM related hospital admission: None since diagnosis

REVIEW OF SYSTEMS:

10 systems reviewed: Yes reviewed 10/14 see podiatric diabetes outpatient note imaged document.

SOCIAL HISTORY: Parents are divorced. Both brothers are away at college. He is in 11th grade. Active in hockey and LaCrosse.

PHYSICAL EXAMINATION:

BP 114/61 Pulse 58 Temp(Src) 97.7 °F (36.5 °C) (Oral) Ht 181.6 m (82%) Wt 68.8 kg (64%)
BMI 20.86 kg/m2 (44%)

In no acute distress.
External ears and canals are normal.
Nasopharynx is patent.

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Page 1 of 6

Glapa, Drew Russell (MRN# 040245480) DOB: 01/09/1996

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Oropharynx has moist mucous membranes and no lesions.
 Neck is supple; no lymphadenopathy or masses. Mildly enlarged thyroid with normal texture.
 Heart has a regular rate and rhythm, without significant murmur.
 Lungs are clear to auscultation; no wheezes or rhonchi.
 Abdomen has positive bowel sounds. It is soft and nontender, without organomegaly or masses.
 Extremities are warm and dry, without abnormalities.
 Normal tone, bulk, and strength.
 Acanthosis nigricans : No
 Lipodystrophy at injection sites : Yes, left abdomen
 Feet Examination - examined : no

A1c: Previous 6.8% Today 9.6%

ASSESSMENT AND PLAN:

Diagnosis - Type 1 diabetes mellitus - worsening control.

1. Insulin Dose Adjustments: Since his A1c has worsened and he reports normal BS, we will increase his lantus dose to 24 units. We discussed with him the importance of diligent diabetes care and his A1c goal. Mother was concerned that the worsening was due to the smart meter. We also discussed that he may be finishing his honeymoon period. We instructed them to fax in BS in 2 weeks so that further dose adjustments can be made. He had annual labs drawn today.

Lantus 24 units at bedtime
 Novolog: Insulin/Carb ratio 1:13 for breakfast, lunch, and dinner
 correction 1:100>150 at breakfast and lunch

2. Follow-up in 3 months.

Blood Sugar Monitoring Goals
 At least 4-6 times daily, including before hockey

HbA1C Goal
 <7.5%

Nutritional Goals
 Well-balanced, healthy meals

Behavioral / Educational Goals
 Record glucose on logs once weekly

Counseled parents/patient on:
 Importance of controlling BG
 ADA goal of A1c<7.5%
 Risks of NOT monitoring BG
 Importance of recording/reviewing BG
 Sx, tx, prevention and risk of hyperglycemia
 Sx, tx, prevention and risk of hypoglycemia
 Carb Counting
 Site rotation
 Parents involvement in diabetes care

EXHIBIT 2

Prevention Magazine Article

<http://www.prevention.com/health/healthy-living/electromagnetic-fields-and-your-health>

Is Dirty Electricity Making You Sick?

Why Are Electromagnetic Fields Dangerous?

Several developments have highlighted the growing hazards of EMF pollution—and the crucial need to address them.

A report that cited more than 2,000 studies found that chronic exposure to even low-level radiation (like that from cell phones) can cause a variety of cancers, impair immunity, and contribute to Alzheimer's disease and dementia, heart disease, and many other ailments. One likely way: EMFs open the blood-brain barrier, causing blood vessels to leak fluid into the brain and damage neurons.

What's more, a less-well known kind of EMF, known as "dirty" or transient electricity, may play an even more damaging role. Transients are largely by-products of modern energy-efficient electronics and appliances—from computers, refrigerators, and plasma TVs to compact fluorescent lightbulbs and dimmer switches—which tamp down the electricity they use. **This manipulation of current creates a wildly fluctuating and potentially dangerous electromagnetic field that essentially charges up the electrons in every cell of your body. Some research suggests that by overlapping the body's signaling mechanisms, transients may interfere with the secretion of insulin, drown out the call and response of the immune system, and cause other physical havoc.**

For more information on the dangers of electromagnetic fields, [read our full investigative report here](#). (below)

Is Dirty Electricity Making You Sick?

Too many electromagnetic fields surrounding us—from cell phones, wifi, and commonplace modern technology—may be seriously harming our health. Here's how to minimize your exposure.

Read more: <http://www.prevention.com/health/healthy-living/electromagnetic-fields-and-your-health#ixzz22iCT1oED>

The California Cluster

IN 1990, the city of La Quinta, CA, proudly opened the doors of its sparkling new middle school. Gayle Cohen, then a sixth-grade teacher, recalls the sense of excitement everyone felt: "We had been

in temporary facilities for 2 years, and the change was exhilarating." But the glow soon dimmed. One teacher developed vague symptoms-- weakness, dizziness--and didn't return after the Christmas break. A couple of years later, another developed cancer and died; the teacher who took over his classroom was later diagnosed with throat cancer. More instructors continued to fall ill, and then, in 2003, on her 50th birthday, Cohen received her own bad news: breast cancer. "That's when I sat down with another teacher, and we remarked on all the cancers we'd seen," she says. "We immediately thought of a dozen colleagues who had either gotten sick or passed away." By 2005, 16 staffers among the 137 who'd worked at the new school had been diagnosed with 18 cancers, a ratio nearly 3 times the expected number. Nor were the children spared: About a dozen cancers have been detected so far among former students. A couple of them have died.

Prior to undergoing her first chemotherapy treatment, Cohen approached the school principal, who eventually went to district officials for an investigation. A local newspaper article about the possible disease cluster caught the attention of Sam Milham, MD, a widely traveled epidemiologist who has investigated hundreds of environmental and occupational illnesses and published dozens of peer-reviewed papers on his findings. For the past 30 years, he has trained much of his focus on the potential hazards of electromagnetic fields (EMFs)--the radiation that surrounds all electrical appliances and devices, power lines, and home wiring and is emitted by communications devices, including cell phones and radio, TV, and WiFi transmitters. His work has led him, along with an increasingly alarmed army of international scientists, to a controversial conclusion: The "electrosmog" that first began developing with the rollout of the electrical grid a century ago and now envelops every inhabitant of Earth is responsible for many of the diseases that impair--or kill--us.

Milham was especially interested in measuring the ambient levels of a particular kind of EMF, a relatively new suspected carcinogen known as high-frequency voltage transients, or "dirty electricity." Transients are largely by-products of modern energy-efficient electronics and appliances--from computers, refrigerators, and plasma TVs to compact fluorescent lightbulbs and dimmer switches--which tamp down the electricity they use. This manipulation of current creates a wildly fluctuating and potentially dangerous electromagnetic field that not only radiates into the immediate environment but also can back up along home or office wiring all the way to the utility, infecting every energy customer in between. With Cohen's help, Milham entered the school after hours one day to take readings. Astonishingly, in some classrooms he found the surges of transient pollution exceeded his meter's ability to gauge them. His preliminary findings prompted the teachers to file a complaint with the Occupational Safety and Health Administration, which in turn ordered a full investigation by the California Department of Health Care Services.

The final analysis, reported by Milham and his colleague, L. Lloyd Morgan, in 2008 in the *American Journal of Industrial Medicine*: Cumulative exposure to transients in the school increased the likelihood a teacher would develop cancer by 64%. A single year of working in the building raised risk by 21%. The teachers' chances of developing melanoma, thyroid cancer, and uterine cancer

were particularly high, as great as 13 times the average. Although not included in the tabulations, the risks for young students were probably even greater.

"In the decades-long debate about whether EMFs are harmful," says Milham, "it looks like transients could be the smoking gun."

The Case against EMFs

Cancer and Electricity--could a disease whose cause has long eluded scientists be linked to perhaps the greatest practical discovery of the modern era? For 50 years, researchers who have tried to tie one to the other have been routinely dismissed by a variety of skeptics, from congressional investigators to powerful interest groups--most prominently electric utilities, cell phone manufacturers, and WiFi providers, which have repeatedly cited their own data showing the linkage to be "weak and inconsistent." Recently, however, in addition to the stunning new investigations into dirty electricity (which we'll return to), several developments have highlighted the growing hazards of EMF pollution--and the crucial need to address them.

The Evidence showing harm is overwhelming.

In 2007, the Bioinitiative Working Group, an international collaboration of prestigious scientists and public health policy experts from the United States, Sweden, Denmark, Austria, and China, released a 650-page report citing more than 2,000 studies (many very recent) that detail the toxic effects of EMFs from all sources. Chronic exposure to even low-level radiation (like that from cell phones), the scientists concluded, can cause a variety of cancers, impair immunity, and contribute to Alzheimer's disease and dementia, heart disease, and many other ailments. "We now have a critical mass of evidence, and it gets stronger every day," says David Carpenter, MD, director of the Institute for Health and the Environment at the University at Albany and coauthor of the public-health chapters of the Bioinitiative report.

Fears about the hazards of cell phones seem justified.

"Every single study of brain tumors that looks at 10 or more years of use shows an increased risk of brain cancer," says Cindy Sage, MA, coeditor of the report. A recent study from Sweden is particularly frightening, suggesting that if you started using a cell phone as a teen, you have a 5 times greater risk of brain cancer than those who started as an adult. The risk rises even more for people who use the phone on only one side of the head. While defenders of cell phone safety claim no scientist can explain why EMFs may be harmful in humans, **a body of reliable and consistent animal research shows that electromagnetic fields, equal to those generated by mobile phones, open the blood-brain barrier, causing blood vessels to leak fluid into the brain and damage neurons.** Ironically, that research (by renowned Swedish neuro-oncologist Leif G. Salford, MD, PhD) began with the goal of finding a way to deliver chemotherapy to brain tumors.

Other countries are revising exposure standards.

Members of the European Union, which has led the way on EMF investigations, are moving quickly to protect their citizens, particularly children and pregnant women. In the past 2 years alone, France, Germany, and England have dismantled wireless networks in schools and public libraries, and other countries are pressing to follow suit. Israel has banned the placement of cellular antennae on residences, and Russian officials have advised against cell phone use for children under 18.

Electrical hypersensitivity (EHS) is becoming more widespread.

Symptoms of EHS, a recently identified condition, include fatigue, facial irritation (resembling rosacea), tinnitus, dizziness, and digestive disturbances, which occur after exposure to visual display units, mobile phones, WiFi equipment, and commonplace appliances. Experts say up to 3% of all people are clinically hypersensitive, as many as one-third of us to a lesser degree.

Electrical pollution is increasing dramatically.

"For the first time in our evolutionary history, we have generated an entire secondary, virtual, densely complex environment--an electromagnetic soup--that essentially overlaps the human nervous system," says Michael Persinger, PhD, a neuroscientist at Laurentian University who has studied the effects of EMFs on cancer cells. And it appears that, more than a century after Thomas Edison switched on his first lightbulb, the health consequences of that continual overlap are just now beginning to be documented.

A History of Harmful Effects

Until Edison's harnessing of electricity, humans' only sources of EMF exposure were the earth's static magnetic field (which causes a compass needle to point north) and cosmic rays from the sun and outer space; over our long evolution, we've adapted to solar EMFs by developing protective pigment. "But we have no protection against other EMF frequencies," says Andrew Marino, PhD, JD, a pioneer in bioelectromagnetics who has done extensive EMF research and a professor in the department of orthopedic surgery at the Louisiana State Health Sciences Center. "How quickly can we adapt our biology to these new exposures? It's the most important environmental health question--and problem--of the 21st century."

Research into the hazards of EMFs has been extensive, controversial--and, at least at the outset, animated by political intrigue. A sampling:

- The Russians first noticed during World War II that radar operators (radar operates using radio frequency waves) often came down with symptoms we now attribute to electrical hypersensitivity syndrome. In the 1960s, during the height of the Cold War, they secretly bombarded the US embassy in Moscow with microwave radiation (a higher-frequency RF used to transmit wireless signals), sickening American employees. Radio wave sickness-- also called microwave sickness-- is now a commonly accepted diagnosis.

- When television (also radio wave) was introduced in Australia in 1956, researchers there documented a rapid increase in cancers among people who lived near transmission towers.
- In the 1970s, Nancy Wertheimer, PhD, a Denver epidemiologist (since deceased), detected a spike in childhood leukemia (a rare disease) among kids who lived near electric power lines, prompting a rash of studies that arrived at similar conclusions.
- In the 1980s, investigators concluded that office workers with high exposure to EMFs from electronics had higher incidences of melanoma--a disease most often associated with sun exposure-- than outdoor workers.
- In 1998, researchers with the National Cancer Institute reported that childhood leukemia risks were "significantly elevated" in children whose mothers used electric blankets during pregnancy and in children who used hair dryers, video machines in arcades, and video games connected to TVs.
- Over the past few years, investigators have examined cancer clusters on Cape Cod, which has a huge US Air Force radar array called PAVE PAWS, and Nantucket, home to a powerful Loran- Antenna. Counties in both areas have the highest incidences of all cancers in the entire state of Massachusetts.
- More recently, the new findings on transients--particularly those crawling along utility wiring--are causing some scientists to rethink that part of the EMF debate pertaining to the hazards of power lines. Could they have been focusing on the wrong part of the EMF spectrum?

Transients: The Post- Modern Carcinogen

Some earlier, notable--albeit aborted--research suggests this may be the case. In 1988, Hydro-Quebec, a Canadian electric utility, contracted researchers from McGill University to **study the health effects of power line EMFs on its employees.** Gilles Theriault, MD, DrPH, who led the research and was chair of the department of occupational health at the university, decided to **expand his focus to include high-frequency transients and found, even after controlling for smoking, that workers exposed to them had up to a 15-fold risk of developing lung cancer.** **After the results were published in the *American Journal of Epidemiology*, the utility decided to put an end to the study.**

That research commenced at a time when energy-efficient devices--the major generators of transients--were beginning to saturate North American homes and clutter up power lines. **[Smart meters generate transients 24/7 because the 240-volt current from the power line must be stepped down to a fluctuating (pulsing) 3–10 volt current to run the meter.]** A telltale sign of an energy-efficient device is the ballast, or transformer, that you see near the end of a power cord on a laptop computer, printer, or cell phone charger (although not all devices have them). When plugged in, it's warm to the touch, an indication that it's tamping down current and throwing off transient pollution. Two of the worst creators of transient radiation: light dimmer switches and

compact fluorescent lightbulbs (CFLs). Transients are created when current is repeatedly interrupted. A CFL, for instance, saves energy by turning itself on and off repeatedly, as many as 100,000 times per second.

So how does the human body respond to this pulsing radiation? "Think of a magnet," explains Dave Stetzer, an electrical engineer and power supply expert in Blair, WI. "Opposite charges attract, and like charges repel. When a transient is going positive, the negatively charged electrons in your body move toward that positive charge. When the transient flips to negative, the body's electrons are pushed back. Remember, these positive-negative shifts are occurring many thousands of times per second, so the electrons in your body are oscillating to that tune. Your body becomes charged up because you're basically coupled to the transient's electric field."

Keep in mind that all the cells in your body, whether islets in the pancreas awaiting a signal to manufacture insulin or white blood cells speeding to the site of an injury, use electricity-- or "electron change"--to communicate with each other. By overlapping the body's signaling mechanisms, could transients interfere with the secretion of insulin, drown out the call-and-response of the immune system, and cause other physical havoc?

Some preliminary research implies the answer is yes. Over the past 3 years, Magda Havas, PhD, a researcher in the department of environmental and resource studies at Trent University in Ontario, has published several studies that suggest exposure to transients may elevate blood sugar levels among people with diabetes and prediabetes and that people with multiple sclerosis improve their balance and have fewer tremors after just a few days in a transient-free environment. Her work also shows that after schools installed filters to clean up transients, two-thirds of teachers reported improvement in symptoms that had been plaguing them, including headache, dry eye, facial flushing, asthma, skin irritation, and depression.

Transients are particularly insidious because they accumulate and strengthen, their frequency reaching into the dangerous RF range. Because they travel along home and utility wiring, your neighbor's energy choices will affect the electrical pollution in your house. In other words, a CFL illuminating a porch down the block can send nasty transients into your bedroom.

Something else is sending transients into your home: the earth. From your high school science texts, you know that electricity must travel along a complete circuit, always returning to its source (the utility) along a neutral wire. In the early 1990s, says Stetzer, as transients began overloading utility wiring, public service commissions in many states told utilities to drive neutral rods into the ground on every existing pole and every new one they erected. "Today, more than 70% of all current going out on the wires returns to substations via the earth," says Stetzer--encountering along the way all sorts of subterranean conductors, such as water, sewer, and natural-gas pipes, that ferry even more electrical pollution into your home.

A Pragmatic Proposal

Of course, these small studies--from Milham, Hydro-Quebec, and Havas-- hardly constitute a blanket indictment of transients. "We're still early in this part of the EMF story," says Carpenter. Does that mean as evidence of their harm accumulates, officials will raise a red flag? Not likely, if past EMF debates are any indication. Power companies have successfully beaten back attempts to modify exposure standards, and **the cell phone industry, which has funded at least 87% of the research on the subject**, has effectively resisted regulation. One good reason has had to do with latency--how long it takes to develop a particular cancer, often 25 years or more. Cell phones have been around only about that long.

But does that mean we avoid any discussion of their *possible* dangers? Again, if the past is a guide, the answer appears to be "probably." American scientists worried about the hazards of smoking, the DES (diethylstilbestrol) pill (given to pregnant women, it caused birth defects), asbestos, PCBs (polychlorinated biphenyls)--the list is lengthy--but officially warned about exposure only after they could say with absolute certainty that these things were harmful. As for protecting ourselves from toxic radiation, we have a lax--and laughable--history. In the 1920s, just a few years after medical imaging devices were invented, physicians were known to entertain their guests by x-raying them at garden parties. In the 1930s, scientists often kept radium in open trays on their desks. Shoe stores used x-ray machines in the 1940s to properly fit children's feet, and radioactive wristwatches with glowing hour hands were popular in the 1950s.

All of which means that, absent prudent safety standards from both public officials and manufacturers (adding a protective filter would add 5 cents to the cost of making a CFL and \$5 to the cost of a laptop), you'll have to protect yourself from EMFs. Here's a reasonable proposition: Practice what is known in Europe as the precautionary principle, which is pretty much what it sounds like. Don't expose yourself unnecessarily to EMF hazards. Don't buy a home next to a WiFi tower. Get a corded telephone instead of a cordless one. Don't let your teenager sleep with a cell phone under her pillow. Don't use your laptop computer in your lap. Treat your EMF-emitting devices with the same cautious respect you do other invaluable modern devices, like your car, which is also dangerous--and can kill. You don't drive in an unnecessarily risky fashion--at high speed or while talking on a cell phone (right?).

The sad truth is that until we have more epidemiologic evidence--whether from disease clusters like the ones at La Quinta and on Cape Cod or from long-term analyses of the health of the world's 4-billion-and-growing cell phone users--we won't know definitively whether electrical pollution is harming us. And even then, we are unlikely to know why or how. "In this country, our research dollars are spent on finding ways to treat disease, not on what causes it--which is to say, how we can prevent it," says Marino. "And that's a tragedy."

But that's also another story.

The Opposing View: "No need for regulation"

In 1993, the National Institutes of health and Department of Energy began an extensive review of all studies on the possible health effects of electromagnetic fields. six years later they completed

their project, called the Electric and Magnetic Fields research and public Information Dissemination (EMF RAPID) program, and reported their findings to Congress: scientific evidence of human health risk from EMF exposure is "weak," they concluded.

While acknowledging a link between both childhood and adult leukemias and EMFs, the researchers' laboratory studies with cells and animals failed to identify a mechanism-- that is, how EMFs might cause cancer. (read the EMF RAPID report at prevention.com/links)

To longtime EMF investigators such as David Carpenter, MD, the NIH dismissal of EMF hazards was patently absurd then and even more so now, given the spate of new findings. "We don't know the mechanism for most carcinogens," he says. "There's this idea that anything that causes cancer must directly damage DNA, which is nonsense because most carcinogens don't directly damage DNA, and physicists are adamant that the energy in everyday EMF exposure is so low, it couldn't possibly do anything to biological systems. It's like saying the Earth is flat because you can't see over the edge."

In fact, biological impacts of EMFs--therapeutic ones--are well known. Low-level frequencies are commonly used to promote healing of wounds and bone fractures, and experimental studies show positive effects of pulsed EMFs in treating pain and depression. Recently, Michael Persinger, PhD, a cognitive neuroscientist at Laurentian University, found that pulsed magnetic fields also halted the growth of melanoma cells in mice.

In a neat twist of logic, many scientists believe that the more we document beneficial effects of EMFs, the better we'll understand their hazards. "If EMF at low intensities can heal," says environmental consultant Cindy Sage, "then when we are constantly and randomly exposed to it from multiple sources, it may also be harmful, like any medicine used indiscriminately."

What was wrong with the La Quinta School?

According to epidemiologist Sam Milham, MD, the middle school was rife with the usual suspects-- fluorescent lighting, electronic devices--whose toxic effects were exacerbated by an electrical supply overloaded with high-voltage transients.

Substandard wiring in the new school also undoubtedly played a role; officials have since added protective shielding to the electrical room. Milham also measured transient pollution along the transmission lines that fed power to the school. "I found it all the way from the substation to the school--more than a mile," Milham says. "There are three other buildings along the route that also serve children. I've reported it to the FCC and the utility, but they ignore the problem."

How electrical pollution harms

Here, a partial spectrum of the electromagnetic fields that surround us, from strong (waves of extremely high frequency and short length) to weak (waves of extremely low frequency and long length). In each category, you'll find sources that generate the EMF, and associated health risks from overexposure.

<p>X-Ray [medical imaging devices] Used to diagnose illness</p>	<p>RISK Damages tissue and organs by breaking bonds</p>
<p>VISIBLE LIGHT [SUN] The only visible EMF</p>	<p>RISK Ultraviolet light can burn skin and cause cancer</p>
<p>MICROWAVE (a higher frequency RF) [CELL AND CORDLESS PHONES AND TOWERS] Can heat tissues and penetrate blood-brain barrier</p>	<p>RISK Increased risk of brain cancer, dementia, and heart disease</p>
<p>RADIO(RF) [RADIO AND TELEVISION SIGNALS] Can disrupt body's cellular interactions</p>	<p>RISK "Radio sickness" and electrical hypersensitivity syndrome</p>
<p>EXTREMELY LOW FREQUENCY (ELF) [POWER LINES] Can cause weak electric currents to flow through the body</p>	<p>RISK Exposure is associated with childhood leukemia</p>

Read more: <http://www.prevention.com/health/healthy-living/electromagnetic-fields-and-your-health#ixzz22iUSKV5z>