



**Dr. Mark A. Israel**

March 27, 2018

**Qualifications**

**PECO MI-1**

**Medical Education:** M.D., Albert Einstein College of Medicine.

**Medical Training:** Internship, Harvard Medical School and affiliated hospitals; Residency in Pediatrics, Harvard Medical School and affiliated hospitals.

**Medical Practice Licenses:** California; New Hampshire.

**Medical Certifications:** Diplomate, American Board of Pediatrics.

**Present Positions:** Professor, Dartmouth Medical School; Executive Director, Israel Cancer Research Fund

**Medical Research Experience:**

National Institutes of Health, Bethesda, Maryland (14 years)

Research Associate, National Institute of Allergies and Infectious Diseases

Senior Investigator, National Institute of Allergies and Infectious Diseases

Clinical Associate, Pediatric Branch, National Cancer Institute.

Senior Investigator, Pediatric Branch, National Cancer Institute

Head, Molecular Genetics Section, Pediatric Branch, National Cancer Institute.

University of California Medical School, San Francisco, California (11 years)

Department of Pediatrics

Brain Tumor Research Center

Molecular Medicine Program

Developmental Biology Program

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Preuss Laboratory for Molecular Neuro-Oncology (Director)

Dartmouth College, Hanover, New Hampshire (16 years and ongoing)

Medical School

Dartmouth-Hitchcock Cancer Center (Director, 15 years)

**Medical Research Publications and Evaluations:** Author of 246 medical research articles; evaluation for scientific journals of research papers submitted for publication (39 years); evaluation of power and radio frequency research on electromagnetic fields and health (32 years); editorial staff of scientific journals (24 years).

**Medical Practice Experience**

U.S. Public Health Service (14 years)

University of California Medical School affiliated hospitals (11 years)

Dartmouth Medical School affiliated hospitals and Dartmouth-Hitchcock Cancer Center (15 years)

**Medical Teaching Experience**

Professor, University of California Medical School (11 years) (Kathleen M. Plant

Distinguished Professor, 4 years)

Professor of Medicine, Pediatrics, and Molecular and Systems Biology, Dartmouth Medical School (16 years)

Students: medical school students, interns, residents, and practicing physicians.

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Subjects include: pediatrics, anatomy, endocrinology, immunology, hematology, neurology, neurosurgery, cardiology, biochemistry, cell biology, genetics, molecular genetics, medical oncology, and radiation oncology.

Supervised research of candidates for Ph.D. degrees in Genetics and in Systems and Molecular Biology.

Supervised advanced research training of over 50 post-doctoral fellows who previously earned M.D. or Ph.D. degrees.

**Professional Recognition (examples)**

American Association for the Advancement of Science Fellow (Elected)

American Society for Clinical Investigation (Elected)

Pediatric Consultant, National Institutes of Health

Pediatric Policy and Coordination Committee, National Institutes of Health

C. Everett Koop Courage Award

Board of Directors, Foundation for Advanced Education in the Sciences (Elected)

Association of American Physicians (Elected)

PDQ Pediatric Cancer Treatment Editorial Advisory Board

Chair, Scientific Advisory Board, Yale Cancer Center

Eurocan Platform Scientific Advisory Board, Sweden

International Board of Trustees, Israel Cancer Research Fund

Farber Award, American Association of Neurological Surgeons

Board of Directors, Association of American Cancer Institutes

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Heinz Karger Memorial Foundation Prize

National Cancer Institute Board of Scientific Counselors, National Institutes of Health

Reviewer, International Human Frontier Science Organization

Scientific Advisory Committee, The Robert Steel Foundation

Selection Committee, Pediatric Scientist Development Program

CCG Genetic Epidemiology Committee

Reviewer, John Sealy Memorial Endowment Fund Review Panel

Referee, Italian Ministry for Education University and Research

Reviewer, Medical Research Council of New Zealand

CCG Biology Research Steering Committee

Scientific Advisory Board, Damon Runyon-Walter Winchell Foundation

National Institutes of Health Clinical Investigator Award Committee

Reviewer, Cell Biology Program, National Science Foundation

Pediatric Consultant, National Institutes of Health

U. S. Public Health Service Commendation Medal (twice)

**Fields of Expertise Related to Testimony In This Case**

Medicine; medical research; radio frequency electromagnetic fields and health.

Recognized as an expert in those fields in prior Pennsylvania Public Utility Commission proceedings in 2016, 2017, and 2018.



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**Methodology Of Medical Evaluation  
PECO MI-2**

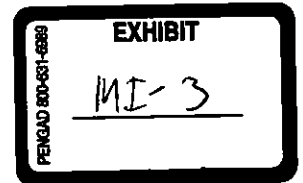
I use the same methodology that I use in usual course of my medical work when determining whether an exposure causes, contributes to, or exacerbates a reported medical condition or symptom.

1. Conduct new searches of medical and scientific databases to identify all studies, both those that report an effect and those that report no effect, of radio frequency fields and the reported medical conditions and symptoms.
2. Analyze individually all studies identified in step 1 that I have not previously analyzed. (If study previously analyzed but all important elements do not immediately come to mind, I analyze study again.)
3. Evaluate all studies identified, both those that report an effect and those that report no effect, taking into account what each type of study can and cannot show, quality of study design and protocol, performance of study in accordance with the protocol, size of study population, completeness of data reporting, use of standard statistical methods for data analysis, and any other factors that may affect the reliability of the study data.
4. Make initial determinations of what the studies as a whole show for each particular reported medical condition and symptom.
5. Consider other reliable sources of information published by public health authorities and their expert panels for their evaluations of the studies, insights, and conclusions.
6. Make final medical evaluation.

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**Medical Evaluation**

**PECO MI-3**

This medical evaluation was arrived at using the Methodology of Medical Evaluation in PECO MI-2.

Complainant claims she has “electrical hypersensitivity”/“electrohypersensitivity” (referred to below as EHS). (Complaint PDF page #s 7-8).

Complainant claims that as a result of that condition complainant experienced the following symptoms when exposed to a PECO AMI meter: exacerbation of medical problems, headaches, memory impairment, cognitive dysfunction, sleep disturbances, cardiac arrhythmias (arrhythmias), other ailments, pain (ears and back), fatigue, occasional depression, irritability, trouble reading and comprehending, short term memory failure, concentration problems. vision compromise from progressively more floaters, worsened visual acuity, progressive agitation, out of sorts feeling, significant anxiety, and lightheadedness. (Complaint and attachments; and attachments to complainant’s responses to PECO’s Interrogatories). Complainant also claims significant pain on the side of the head if a cell phone was held to the ear, pain in hand if holding a cell phone, uncomfortable tingle up the arm when using an iPad, and significant pain in ears and head with some headsets. *Id.*

Studies of people who claim to have EHS have examined whether there is a relationship between those symptoms and exposure to actual radio frequency fields.

As explained in a systematic review of the studies by Rubin:

"The aetiology [cause] of ‘electromagnetic hypersensitivity’ is controversial.

While most patients and some scientists believe that the condition is caused by an

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as yet unrecognised 'bioelectromagnetic' mechanism, most mainstream medical bodies maintain that there is not sufficient evidence to support this theory and that the symptoms experienced by sufferers are unrelated to the presence of electromagnetic fields. Indeed, a working group of the World Health Organisation has recommended that the use of terms like 'electromagnetic hypersensitivity' should be discontinued in favour of the more aetiologically [causally] neutral phrase 'idiopathic environmental intolerance attributed to electromagnetic fields...'" [Rubin 2010] (emphasis added)

(Even though the World Health Organization (WHO) prefers the term Idiopathic Environmental Intolerance to Electromagnetic Fields, it also continues to refer to electromagnetic hypersensitivity on its website, which is the term often used by people who claim they have such a condition and may search for when seeking WHO's evaluation.)

For purposes of a medical evaluation, I believe "Idiopathic Environmental Intolerance attributed to Electromagnetic Fields" (IEI-EMF) is a medically more neutral term and that is why I use it.

There are reliable controlled laboratory studies of IEI-EMF dating back to at least 2002, and also reviews of studies and reviews by public health authorities. The reviews found IEI-EMF and the variety of symptoms and conditions attributed to it are not caused by radio frequency fields. Studies evaluated in such reviews are designed to determine whether reported conditions and symptoms are related to actual exposure to electromagnetic fields rather than sham (no actual) exposure and are called "provocation studies."

An early and careful study [Hietanen 2002] of people who claimed they were hypersensitive to electromagnetic fields is revealing. That study used a double-blind design, which

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means neither the subjects being studied nor the researchers knew when there was or was not radio frequency field exposure. The study used radio frequency fields of 900 and 1800 MHz from cellphones and a sham exposure. (Dr. Davis informs me that the maximum allowable radio frequency field levels from cellphones are almost 15 million times higher than the radio frequency fields 1 meter from a PECO AMI ACLARA meter.) The study found that the number of reported symptoms was higher during sham exposure than during actual exposure and none of the test subjects could distinguish actual radio frequency field exposure from sham exposure. The study concluded that adverse subjective symptoms and sensations perceived by the test subjects were not produced by radio frequency fields.

Another study designed to determine if radiofrequency fields affected the well-being of individuals who claimed to have electromagnetic hypersensitivity, compared to those who did not, found that those who made that claim reported lower levels of well-being when they knew they were exposed to a radiofrequency field, but when they did not know whether they were exposed their symptoms were not associated with exposure to radio frequency fields (Eltiti 2015).

The systematic review of the studies of Idiopathic Environmental Intolerance to Electromagnetic Fields by Rubin, referred to above, was careful and thorough and reported:

“Including studies reported in our earlier review, 46 blind or double-blind provocation studies in all, involving 1175 IEI-EMF [Idiopathic Environmental Intolerance to Electromagnetic fields] volunteers, have tested whether exposure to electromagnetic fields is responsible for triggering symptoms in IEI-EMF. No robust evidence could be found to support this theory. However, the studies included in the review did support the role of the nocebo effect with symptoms in triggering acute symptoms in IEI-EMF sufferers. Despite the conviction of IEI-

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EMF sufferers that their symptoms are triggered by exposure to electromagnetic fields, repeated experiments have been unable to replicate this phenomenon under controlled conditions. A narrow focus by clinicians or policy makers on bioelectromagnetic mechanisms is therefore, unlikely to help IEI-EMF patients in the long-term.” [Rubin 2010]

A number of public health authorities have evaluated the studies of Idiopathic Environmental Intolerance to Electromagnetic Fields:

The United Kingdom Health Protection Agency 2012 report found:

“A large body of experimental evidence now exists concerning the impact of RF fields on self-reported symptoms. ... [W]hen taken together the experimental evidence suggests that short-term exposure to RF fields below guideline levels ... does not cause acute symptoms, either in the general public or in people who report being sensitive to electromagnetic fields.”

The Royal Society of Canada Expert Panel 2013 report found:

“Taken together, research in the past ten years does not provide firm evidence for the hypotheses that people with IEI-EMF can perceive RF energy at levels below the limits in SC6 or that there is a causal link between exposure to RF energy and their symptoms.”

The New Zealand Ministry of Health 2015 report found:

“Recent reviews of these studies continue to conclude that people who consider themselves unusually sensitive to EMFs are, in fact, unable to detect EMFs, and the occurrence of symptoms appears unrelated to exposures... .”

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The Scientific Committee on Emerging and Newly Identified Health Risks of the European Commission 2015 report found:

“The symptoms that are attributed by people to RF EMF exposure can sometimes cause serious impairments to a person’s wellbeing. However, research conducted since the previous Opinion adds weight to the conclusion that RF EMF exposure is not the cause of these symptoms. This applies to the general public, children and adolescents, and to people with idiopathic environmental intolerance attributed to electromagnetic fields. Recent meta-analyses of observational and provocation data support this conclusion.”

In sum, the studies of IEI-EMF and the reviews of them by public health authorities do not show that radio frequency fields cause, contribute to, or exacerbate IEI-EMF or the various symptoms and conditions attributed to it.

Complainant claims that the reported symptoms were experienced when a PECO AMI meter was installed at complainant’s residence and disappeared or subsided when the meter was not installed. That claim is consistent with the IEI-EMF studies that show people who claim to have IEI-EMF report symptoms when they believe they are being exposed to radio frequency fields, even though there is no relationship between actual radio frequency field exposure and the reporting of symptoms.

Expert Opinion

I hold the expert opinions set forth in this report to a reasonable degree of medical certainty.

Based on my medical evaluation, it is my expert opinion there is no reliable medical basis to conclude that radio frequency fields from PECO’s AMI meters did or will cause, contribute to, or exacerbate IEI-EMF or any of the symptoms or conditions attributed to it by the complainant.