Dr. Mark A. Israel

Qualifications

RECEIVED
JUL 21 2020
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

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: Executive Director, Israel Cancer Research Fund, Professor Emeritus of Medicine, Pediatrics, and Molecular and Systems Biology, Dartmouth Medical School; Director Emeritus, Norris Cotton Cancer Center, Dartmouth Medical School and Dartmouth Hitchcock Medical Center.

Medical Research Experience:

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

Research Associate, National Institute of Allergy and Infectious Diseases

Senior Investigator, National Institute of Allergy 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

EXHIBIT
PENGAD 800-631-6989
MI-1
WPP

Preuss Laboratory for Molecular Neuro-Oncology (Director)

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

Dartmouth Medical School

Norris Cotton Cancer Center at Dartmouth-Hitchcock Cancer Center (Director, 15 years)

Medical Research Publications and Evaluations: Medical research for 40 years in a wide variety of areas, including systems biology, biochemistry, cell biology, cancer, molecular biology, and molecular genetics. Author of 250 medical research articles, chapters in medical textbooks, such as section on brain cancer in the widely used Harrison's *Principles of Internal Medicine,* and co-Editor of the textbook *The Molecular Basis of Cancer.* Peer-review evaluations for scientific journals of research papers submitted for publication; evaluation of power and radio frequency research on electromagnetic fields and health; editorial staff of scientific journals.

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 (16 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 students, graduate students, interns, residents, and practicing physicians

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)

American Association for Cancer Research

PDQ Pediatric Cancer Treatment Editorial Advisory Board

Chair, Scientific Advisory Board, Yale Cancer Center

Eurocan Platform Scientific Advisory Board, Sweden

Farber Award, American Association of Neurological Surgeons

Board of Directors, Association of American Cancer Institutes

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 and medical research, particularly as related to radio frequency fields and health. Recognized as an expert in those fields in prior Pennsylvania Public Utility Commission proceedings 2016 – 2020.

RECEIVED
JUL 21 2020
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

Public Health Reviews
RF Fields and Claimed Health Effects

U.S. Food & Drug Administration 2020
Review of Published Literature between 2008 and 2018 of Relevance to Radiofrequency Radiation and Cancer

> "Based on the FDA's ongoing evaluation, the available epidemiological and cancer incidence data continues to support the Agency's determination that there are no quantifiable adverse health effects in humans caused by exposures at or under the current cell phone exposure limits." *[p. 5]*

World Health Organization 2016
About electromagnetic fields, Summary of health effects

> "Despite extensive research, to date there is no evidence to conclude that exposure to low level electromagnetic fields is harmful to human health." *[p. 2]*

> "To date, no adverse health effects from low level, long-term exposure to radiofrequency or power frequency fields have been confirmed" *[p. 2]*

New Zealand Ministry of Health 2015
Interagency Committee on the Health Effects of Non-ionising Fields: Report to Ministers

> "While a great deal of research has been carried out to investigate the potential effects of exposures to RF fields on health, particularly exposures associated with cellphone use, there are still no clear indications of health effects caused by exposures that comply with the limits in the New Zealand RF field exposure standard." *[p. 18]*

European Commission Scientific Committee SCENIHR 2015
SCENIHR Opinion on Potential health effects of exposure to electromagnetic fields

> "Overall, the epidemiological studies on mobile phone RF EMF exposure do not show an increased risk of brain tumours. Furthermore, they do not indicate an increased risk for other cancers of the head and neck region. ... Epidemiological studies do not indicate increased risk for other malignant diseases, including childhood cancer." *[p. 5]*

World Health Organization 2014
Electromagnetic fields and public health: mobile phones – Fact Sheet No. 193.

> "A large number of studies have been performed over the last two decades to assess whether mobile phones pose a potential health risk. To date, no adverse health effects have been established as being caused by mobile phone use."

EXHIBIT
MI-2
WPP
PENGAD 800-631-6989

Public Health Reviews
RF Fields and Claimed Health Effects

Royal Society of Canada 2014
Expert Panel: A Review of Safety Code 6 (2013): Health Canada's Safety Limits for Exposure to Radiofrequency Fields

> "[T]he Panel has concluded that the balance of evidence at this time does not indicate negative health effects from exposure to RF energy below the limits recommended in the Safety Code." *[p. 10]*

Public Health England 2013
Guidance: Wi-fi radio waves and health

> "There is no consistent evidence to date that exposure to radio signals from wi-fi and WLANs adversely affects the health of the general population." *[p. 1]*

Norwegian Institute of Public Health 2012
Low-level radiofrequency electromagnetic fields – an assessment of health risks and evaluation of regulatory practice

> "A large number of studies have examined the possible effects of exposure to weak RF fields (i.e., exposure within the ICNIRP's reference values). The studies have been performed on cells and tissues, and in animals and humans. The effects that have been studied apply to changes in organ systems, functions and other effects. There are also a large number of population studies with an emphasis on studies of cancer risk. The large total number of studies provides no evidence that exposure to weak RF fields causes adverse health effects." *[p. 38]*

Nordic Radiation Authorities (Danish National Board of Health, Finland Radiation and Nuclear Safety Authority, Icelandic Radiation Safety Authority, Norwegian Radiation Protection Authority, Swedish Radiation Safety Authority) 2009
EXPOSURE OF THE GENERAL PUBLIC TO RADIOFREQUENCY ELECTROMAGNETIC FIELDS - A joint statement from the Nordic Radiation Safety Authorities

> "The Nordic authorities agree that there is no scientific evidence for adverse health effects caused by radiofrequency field strengths in the normal living environment at present. This conclusion concurs with the opinion of international scientific and advisory bodies listed as references below [ICNIRP, 1998 and 2009; WHO, 2005 and 2006; SCENIHR 2009; SSI`s Independent Expert Group on Electromagnetic Fields, 2007]. The Nordic authorities therefore at present see no need for a common recommendation for further actions to reduce these radiofrequency fields." *[p. 4]*

RECEIVED
JUL 21 2020
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

EXHIBIT
MI-3
WPP
PENGAD 800-631-6989

State Health Agency & PUC Reviews of Smart Meters and Health

State Health Agency Reviews:

North Carolina Department of Health and Human Services, Division of Public Health, Occupational and Environmental Epidemiology Branch 2015

Health Impacts of Advanced Metering Systems (Smart Meters)

"Non-thermal health concerns evaluated included cancer, reproductive effects, cellular effects, neurological behavioral effects, and electromagnetic sensitivity. There is insufficient evidence to link RF exposures to adverse health outcomes. This is consistent with conclusions of other organizations including the National Cancer Institute, the Centers for Disease Control and Prevention, and the World Health Organization. It is also consistent with smart meter reviews performed by other states." *[Executive Summary]*

Arizona Department of Health, Office of Environmental Health 2014

Public Health Evaluation of Radio Frequency Exposure from Electronic Meters

"Exposure to electric meters (AMI and AMR) is not likely to harm the health of the public. This conclusion was reached because (1) none of the detected power densities exceeded the FCC standard of 6/Wm2. This standard was determined based on thermal effects, and was set to prevent whole-body heat stress and excessive localized tissue heating; (2) available government assessments and scientific literature indicated that there is no consistent or convincing evidences to support a cause-and-effect relationship related to the exposures to RF frequency (900-930 MHz) used by the smart meters;" *[p. 26]*

Vermont Department of Health 2012

Radio Frequency Radiation and Health: Smart Meters

"After extensive review of the scientific literature available to date and current FCC regulatory health protection standards, we agree with the opinion of experts:

- The thermal health effects of RFR are well understood, and are the current basis for regulatory exposure limits. These limits are sufficient to prevent thermal health effects.
- Non-thermal health effects have been widely studied, but are still theoretical and have not been recognized by experts as a basis for changing regulatory exposure limits.

The Vermont Department of Health has concluded that the current regulatory standards for RFR from smart meters are sufficient to protect public health." *[p. 1]*

Maine Center for Disease Control 2010

Maine CDC Executive Summary of Review of Health Issues Related to Smart Meters

"In conclusion, our review of these agency assessments and studies do not indicate any consistent or convincing evidence to support a concern for health effects related to the use of radiofrequency in the range of frequencies and power used by smart meters. They also do not

State Health Agency & PUC
Reviews of Smart Meters and Health

indicate an association of EMF exposure and symptoms that have been described as electromagnetic sensitivity." *[p. 4]*

Public Utility Commission Reviews:

Massachusetts Department of Public Utilities 2014

Investigation by the Department of Public Utilities on its own Motion into Modernization of the Electric Grid

"The Department takes seriously the testimony and comments that express concern about potential health effects resulting from exposure to RF emitted by certain electric meters. However, after thorough review and consideration of the issue, the Department is unaware of any credible, peer-reviewed scientific studies that demonstrate a direct human health risk from exposure to the low-level RF signals from advanced meters." *[p. 37-38]*

"We find that many studies referenced by commenters asserting health impacts from advanced meters do not meet this standard and, therefore, cannot be considered credible. For example, many commenters cite the 2007 BioInitiative Report and its update, the 2012 BioInitiative Report. Neither of these reports has been objectively peer reviewed, as noted by international health agencies criticizing them for not being an objective reflection of the current state of scientific knowledge." *[p. 39-40]*

"In assessing arguments and cited studies, we also consider their consistency with the weight of scientific evidence and determinations made by other jurisdictions. Other jurisdictions that have considered potential health impacts of RF, including regulatory bodies and public health organizations, do not find that RF exposure from advanced meters, operating under established U.S. and international exposure limit guidelines, leads to adverse health effects." *[p. 42]*

"Some commenters assert that advanced meters pose a particular health threat to individuals with electromagnetic hypersensitivity. We recognize that certain individuals report a heightened sensitivity to RF emissions and attribute illness or other physical symptoms to RF exposure. While we appreciate that their symptoms are serious, based on all of the testimony and the materials we have reviewed we are unable to conclude that RF exposure and, specifically, RF from electric meters, is the cause of those symptoms." *[p. 46]*

Maine Public Utility Commission 2014

Order, Docket No. 2011-00262, Docket No. 2012-00412

"[W]e find that Advanced Metering Infrastructure (AMI), including the use of "smart meters," as implemented and operated by Central Maine Power Company (CMP or the Company), does not present a credible threat to the health and safety of CMP's customers and, based on the record of this proceeding is, therefore, safe." *[p. 1]*

State Health Agency & PUC
Reviews of Smart Meters and Health

District of Columbia Public Service Commission 2013

Report of an Investigation into Smart Meters

> "[T]he Commission has found no credible, scientific evidence to show that the level of RF emissions from the Pepco smart meters is a threat to human health." *[p. 4]*

Michigan Public Service Commission 2012

U-17000 Report to the Commission

> "After careful review of the available literature and studies, the Staff believes that the health risk from the installation and operation of metering systems using radio transmitters is insignificant. In addition, the appropriate federal health and safety regulations provide assurance that smart meters represent a safe technology." *[p. 12]*

Texas Public Utility Commission 2012

Report on Health and Radiofrequency Electromagnetic Fields from Advanced Meters

> "Decades of scientific research have not provided any proven or unambiguous biological effects from exposure to low-level radio frequency signals. Further, Staff reviewed all available material and found no credible evidence to suggest that smart meters emit harmful amounts of Electromagnetic Field (EMF) radiation." *[p. 1]*

> "It is important to note that one must use caution when relying solely on the results of individual research studies because conflicts or inconsistencies may exist among the results of other individual studies. Laymen often may not recognize poorly executed studies, or they can misinterpret the results of properly conducted scientific research. Either circumstance may lead a casual observer to draw errant conclusions. Furthermore, it is impossible to scientifically prove absolute safety (the null hypothesis)." *[p. 1]*

> "The 'BioInitiative Report' is an example of a report that received notoriety despite being viewed negatively by the research community. Its contributors are described as a group of 14 scientists, researchers, and public health policy professionals. The stated purpose of the report was to document "bioeffects, adverse health effects and public health conclusions about impacts of non-ionizing radiation." The document was edited by Cindy Sage, an environmental consultant, and Dr. David O. Carpenter, director of the Institute for Health and the Environment at the State University at Albany (New York).

> The report is often cited by opponents of wireless technology, but it was widely criticized by government research agencies and subject matter experts in Australia, Belgium, the European Commission (EC), France, Germany, and the Netherlands. It was also criticized by EPRI and the IEEE. The overall opinion of these institutions was that the report had many shortcomings. Some of the stated criticisms were that the report:

- Provided views that were not consistent with the consensus of science;

State Health Agency & PUC
Reviews of Smart Meters and Health

- Recommended safety limits that were not supported by the weight of scientific evidence;
- Included selection bias in several research areas;
- Lacked objectivity and balance; and
- Suffered from uneven editing quality.

Some researchers have developed a level of notoriety for their assertions regarding the purported dangers of EMF exposure. Opponents of wireless technology have naturally called upon these people to testify as expert witnesses and this tends to raise their profiles to an even greater degree. These efforts have not always been successful. For example, Carpenter attempted to rely on his work on the BioInitiative Report as one of the qualifications to testify as an expert for intervenors opposed to plans by Hydro Québec, a utility in Canada, to install wireless smart meters on homes and businesses. The regulatory authority for the province, The Québec Energy Board (The Board), stated (translated from French):

> 'The Board has refused to grant the requested expert status on the grounds that David Carpenter is not a doctor, never had clinical experience with patients and has never personally done any research on the effects of RF health.[55] The Board does not, however, reject his testimony in the case because of his knowledge on the research done by others in this field. It therefore accepted this testimony, subject to establishing the probative value to be accorded.'

The Board also did not view Carpenter as independent and unbiased, as required by its rules governing the expectations of expert witnesses. The Board stated (translated from French):

> 'Clearly, the witness Carpenter, expert or not, does not meet the criteria of objectivity which the Board is entitled to expect.'" *[pp. 17-18]*

RECEIVED
JUL 21 2020
PA PUBLIC UTILITY COMMISSION
SECRETARY'S BUREAU

Public Health Reviews
RF Fields and Claimed Electromagnetic Hypersensitivity

EXHIBIT
MI-4
WPP
PENGAD 800-631-6989

US Food & Drug Administration 2020
Scientific Evidence for Cell Phone Safety

"To date, the scientific evidence indicates symptoms experienced by people who self-identify as having electromagnetic hypersensitivity occur when the individual believes they are being exposed to radio frequency energy. Based on the available scientific evidence, their very real symptoms are not the result of radio frequency exposures. Many studies have been done to determine if participants can determine if they are being exposed to RF or a sham exposure. The results indicate people cannot sense when they are being exposed to RF."

World Health Organization 2016
About electromagnetic fields, Summary of health effects

"Some members of the public have attributed a diffuse collection of symptoms to low levels of exposure to electromagnetic fields at home. Reported symptoms include headaches, anxiety, suicide and depression, nausea, fatigue and loss of libido. To date, scientific evidence does not support a link between these symptoms and exposure to electromagnetic fields. At least some of these health problems may be caused by noise or other factors in the environment, or by anxiety related to the presence of new technologies." *[p. 2]*

***

"Some individuals report "hypersensitivity" to electric or magnetic fields. They ask whether aches and pains, headaches, depression, lethargy, sleeping disorders, and even convulsions and epileptic seizures could be associated with electromagnetic field exposure.

There is little scientific evidence to support the idea of electromagnetic hypersensitivity. Recent Scandinavian studies found that individuals do not show consistent reactions under properly controlled conditions of electromagnetic field exposure. Nor is there any accepted biological mechanism to explain hypersensitivity. Research on this subject is difficult because many other subjective responses may be involved, apart from direct effects of fields themselves." *[p. 2]*

New Zealand Ministry of Health 2015
Interagency Committee on the Health Effects of Non-ionising Fields: Report to Ministers

"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.... There is experimental evidence suggesting a nocebo effect (ie, someone believing that they are exposed, even when they are not) could provoke the symptoms." *[p. 14]*

Public Health Reviews
RF Fields and Claimed Electromagnetic Hypersensitivity

European Commission Scientific Committee SCENHIR 2015
SCENIHR Opinion on Potential health effects of exposure to electromagnetic fields

> "Symptoms that are attributed by some people to various RF EMF exposure can sometimes cause serious impairments to a person's quality of life. However, research conducted since the previous SCENIHR Opinion adds weight to the conclusion that RF EMF exposure is not causally linked to these symptoms. This applies to the general public, children and adolescents, and to people with idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF). Recent meta-analyses of observational and provocation data support this conclusion." *[p. 6]*

The Royal Society of Canada 2014
Expert Panel: A Review of Safety Code 6 (2013): Health Canada's Safety Limits for Exposure to Radiofrequency Fields

> "Idiopathic Environmental Intolerance Attributed to Electromagnetic Fields (IEI-EMF), or Electrical Hypersensitivity, also remains an issue of serious concern that deserves further investigation. However, there is no 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." *[p. 18]*

Norwegian Institute of Public Health 2012
Low-level radiofrequency electromagnetic fields – an assessment of health risks and evaluation of regulatory practice.

> "The relatively extensive literature provides no evidence that exposure to electromagnetic fields is the real cause of the health problems that individuals attribute to electromagnetic fields, whether exposure occurs alone or in combination with other factors that may affect the induction of symptoms. There is also no evidence that individuals with health problems that they attribute to electromagnetic fields are able to detect such exposure." *[p. 37]*

United Kingdom Health Protection Agency 2012
Report of Independent Advisory Group on Non-Ionising Radiation

> "[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." *[p. 243]*