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The authors of a peer-reviewed study published Tuesday warned about the risks of exposure to radiation from 5G technology and said their research shows existing exposure limits for wireless radiation are inadequate, outdated and harmful to human health and wildlife.

by [Michael Nevradakis, Ph.D.](#), [The Defender](#)

October 19, 2022

The authors of a peer-reviewed study published Tuesday warned about the risks of exposure to [radiation from 5G technology](#) and said their research shows existing exposure limits for wireless radiation are inadequate, outdated and harmful to human health and wildlife.

The International Commission on the Biological Effects of Electromagnetic Fields ([ICBE-EMF](#)) conducted the study, which was published in Environmental Health.

The ICBE-EMF called for an independent assessment of the [dangers and impacts of wireless radiation](#), a campaign to inform the public of the health risks associated with radiation and “an immediate moratorium on further rollout of 5G wireless technologies until safety is demonstrated and not simply assumed.”

In an [ICBE-EMF press release](#), Dr. Lennart Hardell, an oncologist, author of more than 100 papers on non-ionizing radiation and lead author of the study, said:

“Multiple robust human studies of cell phone radiation have found increased risks for [brain tumors](#), and these are supported by clear evidence of carcinogenicity of the same cell types found in animal studies.”

In interviews with [The Defender](#), Hardell and Joel M. Moskowitz, director of the Center for Family and Community Health at the University of California, Berkeley School of Public Health, discussed the study’s findings, the ICBE-EMF’s new initiative to raise awareness of the risks of 5G and explained who is most susceptible to the potentially harmful effects of [wireless radiation](#).

According to Moskowitz, exposure to cellphones and other wireless devices should be limited, especially for pregnant women and children.

Hardell and Moskowitz – both of whom are associated with ICBE-EMF and its study – also blamed regulatory agencies such as the Federal Communications Commission (FCC) and the International Commission on Non-Ionizing Radiation Protection ([ICNIRP](#)) for ignoring the risks – despite hundreds of studies indicating the dangers of exposure to wireless radiation – and called for legal action and increased public pressure.

Study: wireless radiation exposure limits ‘harmful,’ ‘based on false suppositions’

The ICBE-EMF describes itself as “a multi-disciplinary consortium of scientists, doctors and related professionals who are, or have been, involved with research related to the biological and health effects of electromagnetic frequencies up to and including 300 GHz.”

Founded in 2021, the ICBE-EMF – which says it “is dedicated to

ensuring the protection of humans and other species from the harmful effects of [non-ionizing radiation](#)” – arose from the [International EMF Scientist Appeal](#), a petition signed by more than 240 scientists representing more than 2,000 published papers.

According to the new ICBE-EMF study, the [radiofrequency radiation \(RFR\) exposure limits](#) established in the 1990s by the FCC and the ICNIRP “were based on results from behavioral studies conducted in the 1980s involving 40-60 minute exposures in 5 monkeys and 8 rats” – after which “arbitrary safety factors” were applied “to an apparent threshold specific absorption rate (SAR)” of 4 watts per kilogram.

According to a [fact sheet](#) accompanying the study’s release, this means that “no adverse health effects from RFR exposure” were claimed to exist “below the ... SAR of 4 watts per kilogram for frequencies ranging from 100 kHz to 6 GHz.”

The paper argues these [radiation exposure limits](#) were based “on two major assumptions” – that any biological effects of exposure to wireless radiation “were due to excessive tissue heating and no effects would occur below the putative threshold SAR,” and “twelve assumptions that were not specified by either the FCC or ICNIRP.”

The limits set by the FCC and ICNIRP also ignore “the past 25 years of extensive research on RFR” which, according to the study, “demonstrates that the assumptions underlying the FCC’s and ICNIRP’s exposure limits are invalid and continue to present a public health harm,” and “are based on false suppositions.”

These harms, which have been observed even “below the assumed threshold SAR,” include “non-thermal induction of reactive oxygen species, DNA damage, cardiomyopathy, carcinogenicity, sperm damage, and neurological effects, including electromagnetic hypersensitivity,” plus “increased brain and

thyroid [cancer risk](#).”

Despite these documented risks, the study explains that in 2020, the FCC and ICNIRP “reaffirmed the same limits that were established in the 1990s” – limits that “do not adequately protect workers, children, [hypersensitive individuals](#), and the general population from short-term or long-term RFR exposures.”

According to the ICBE-EMF press release, the FCC and ICNIRP “have ignored or inappropriately dismissed hundreds of scientific studies documenting adverse health effects at exposures below the threshold dose claimed by these agencies,” which is “based on science from the 1980s – before cell phones were ubiquitous.”

Scientists speak out on wireless exposure risks

Hardell and Moskowitz both told The Defender that wireless radiation poses a [higher risk to pregnant women](#) and children. Moskowitz said people who are electromagnetically hypersensitive also are especially at risk.

Both recommended, however, that all individuals minimize their exposure to wireless radiation as much as possible.

Moskowitz developed an online resource compiling advice and suggestions for individuals to [reduce exposure to wireless radiation](#).

The recommendations include keeping devices such as smartphones and cordless phones at a distance from the body and particularly the head, using these devices in areas where there is a strong signal, reducing secondhand exposure to other individuals’ devices and switching off household wireless devices at bedtime.

Moskowitz cited specific concerns about 5G technology, telling The Defender:

“5G has many new features never tested for safety, including different carrier frequencies, new modulation and pulsing schemes, beam-forming, phased arrays, and massive [MIMO](#) [multiple input, multiple output].

“Studies have been conducted that test some carrier frequencies used in 5G but not the other features which could result in brief but very high-intensity exposures.

“The proximity of small cell antennas near where people live and work could pose health problems in addition to wireless radiation exposure from 5G cellphones.”

Hardell said that with [5G technology](#), “the pulses can be extremely high and also be additive from different [wireless] sources,” adding that “risks are not studied, especially not long-term.”

In a July 2022 article on safemmr.com, a website on the dangers of wireless radiation exposure operated by Moskowitz, he focused on the [millimeter wave](#) (MMW) used in the “high-band” (30-300 GHz) frequencies utilized by 5G networks.

Moskowitz wrote that the characteristics of such MMWs are different than the “low-band” frequencies primarily used up until now for cellular and wireless transmission.

According to Moskowitz:

“The transmissions can be directed into narrow beams that travel by line-of-sight and can move data at high rates (e.g., up to 10 billion bits per second) with short lags (or latencies) between transmissions.

“Millimeter waves (MMWs) are mostly absorbed within 1 to 2 millimeters of human skin and in the surface layers of the cornea. Thus, the skin or near-surface zones of tissues are the primary targets of the radiation.

“Since skin contains capillaries and nerve endings, MMW bio-

effects may be transmitted through molecular mechanisms by the skin or through the nervous system.”

Such exposure, writes Moskowitz, can lead to thermal (heating) effects, initially causing a “heat sensation followed by pain and physical damage at higher exposures,” and ultimately impacting “the growth, morphology and metabolism of cells,” inducing “production of free radicals,” and causing DNA damage.

Moskowitz said there’s been no real research on the biologic or [health effects of 5G](#), noting that out of 35,000 publications on electromagnetic fields found on the [EMF Portal](#) as of Aug. 1, 2022, only 408 pertained to 5G, and only seven were medical or biological studies.

However, even these seven studies are inadequate, Moskowitz wrote:

“A closer look, however, reveals that although these studies employed carrier frequencies used in 5G, none of these studies modulated or pulsed the signal as required by 5G or used other features of 5G technology (e.g., beamforming, massive MIMO, and phased arrays) that are likely to affect the nature and extent of biological or health effects from exposure to this radiation.”

According to [Children’s Health Defense](#) (CHD), more than [1,500 peer-reviewed scientific papers](#) demonstrate biological and health impacts from exposure to electromagnetic fields (EMFs).

In August 2021, the U.S. Court of Appeals for the District of Columbia Circuit [ruled in favor of CHD](#) in its [lawsuit against the FCC’s decision](#) not to review its health and safety guidelines regarding 5G and wireless technology, finding that [the FCC did not provide](#) a reasoned explanation for its determination that its current guidelines provide adequate protection to RF radiation.

The wireless radiation exposure limits reaffirmed by the FCC and ICNIRP make no provision for the advent and growth of 5G technologies, Moskowitz said. But instead of addressing the issue, the telecommunications industry and its experts have accused many scientists who have researched the effects of cellphone radiation of “fear-mongering” over the advent of [wireless technology’s 5G](#),” he added.

Regulators bear ‘full responsibility’ for harmful health effects caused by exposure to wireless radiation

Hardell told The Defender that the failure of regulatory agencies to set proper exposure limits means they “have the full responsibility” for deaths and injuries stemming from exposure to wireless radiation.

[According to Moskowitz](#), a [report on 5G](#) released in 2020 by the U.S. Government Accountability Office “recognizes that public concern regarding the health effects from exposure to radiofrequency radiation (RFR) is likely to intensify with the deployment of 5G technology” and that “long-term effects are unknown.”

However, according to the report, “Officials from federal regulatory and research agencies did not indicate any cause for alarm due to these unknowns because of the research from observational studies on pre-5G technology and from experimental studies of high-band 5G technology.”

Moskowitz blamed the failure not just on the FCC, but also on the U.S. Food and Drug Administration (FDA).

“For more than two decades, FDA officials have ignored the lack of consensus in the scientific community regarding the safety of RFR,” Moskowitz wrote in 2020. “The majority of scientists who study RFR effects now believe that current RFR national and international safety standards are inadequate to protect our health.”

Moskowitz pointed out that the FCC relies on the [FDA for health-related recommendations](#) – and “upon advice from lobbyists and engineers and scientists affiliated with the telecommunications or wireless industry,” adding that a “[revolving door](#)” exists between the FCC, these two industries and their lobbying groups.

According to the ICBE-EMF fact sheet:

“Since 2002, multiple robust epidemiologic studies of cell phone radiation have found increased risks for brain tumors, which are supported by evidence of carcinogenicity of the same cell types (glial cells and Schwann cells) from animal studies.”

And in the ICBE-EMF press release, Dr. Ronald Melnick, ICBE-EMF chair and former senior toxicologist with the U.S. National Toxicology Program at the National Institute of Environmental Health Sciences, said:

“Many studies have demonstrated oxidative effects associated with exposure to low-intensity RFR, and significant adverse effects including cardiomyopathy, carcinogenicity, DNA damage, neurological disorders, increased permeability of the blood-brain barrier, and sperm damage.”

Scientists call for moratorium on 5G deployment

Scientists associated with the newly released paper and the ICBE-EMF called for the deployment of 5G networks to be paused until its potential harms to humans and nature are more thoroughly studied.

Hardell told The Defender that “there should be a moratorium on 5G until studied,” describing this situation as “a sad story by industry, politicians and their affiliated scientists.” “Ignorance and doubt is their product,” he said.

The authors of the paper said health-protective exposure limits are “urgently needed” for humans and the environment.

They added:

“These limits must be based on scientific evidence rather than on erroneous assumptions, especially given the increasing worldwide exposures of people and the environment to RFR, including novel forms of radiation from 5G telecommunications for which there are no adequate health effects studies.”

They also said an independent evaluation “based on the scientific evidence with attention to the knowledge gained over the past 25 years” is needed to establish lower exposure limits.

ICBE-EMF also called for health studies to be completed prior to any future deployment of 5G networks.

According to Hardell, more is needed than a moratorium on 5G deployment, however. He told The Defender:

“After more than 20 years of research on health risks from this technology without success to implement precaution, we need legal work.

“The polluter must pay. Radiofrequency radiation is an environmental pollutant that needs to be investigated and regulated. It needs to be classified as a Group 1 human carcinogen by [IARC](#) [the International Agency for Research on Cancer].”

Under the [IARC’s classification](#), “Group 1” encompasses compounds or physical factors that are “carcinogenic to humans.”

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