

## Comments to the FDA Regarding Virtual Reality in a Pediatric Population

Theodora Scarato Executive Director of Environmental Health Trust

<https://ehtrust.org>

### Virtual reality with a cellular or Wi-Fi enabled phone creates radiofrequency radiation exposure in the brain of the user.

Children are more vulnerable to cell phone radiofrequency radiation because:

- **Proportionately deeper penetration of RFR into the brain:** Children have smaller heads than adults with shorter distances from their skull to the brain center, resulting in higher RFR absorption extending deeper into the brain compared to an adult ([Morris et al., 2015](#), [Ghandi 2015](#), [Ferreira and de Salles 2015](#), [Wiat et. al., 2008](#)).
- **Thinner skulls and higher conductivity of tissues allow higher intensities of RFR into the eye and brain:** Scientific modeling finds younger brains absorb proportionally more radiation in the eyes and brain—grey matter, cerebellum and hippocampus ([Fernandez et al. 2018](#), [Christ et al., 2010](#), [Mohammed 2017](#)).
- **More active stem cells in their bodies:** Research shows that stem cells are more sensitive to microwave radiation, and children have more active stem cells ([Belyaev 2010](#), [Williams et al. 2006](#)).
- **Developing brains are more vulnerable to neurotoxic exposures:** Not only do children absorb higher peak doses in the brain than adults, their brain is growing rapidly, subject to different windows of vulnerability, and thus more susceptible to adverse impacts and environmental neurotoxicants. Exposures that take place during fetal development or early childhood may cause permanent brain injury, whereas the same doses may have little impact in adults ([Heindel et al., 2015](#), [Weiss 2000](#), [Lanphear 2015](#), [Redmayne and Johansson 2014](#) and [2015](#)).
- **Regulations based on an adult head and body:** Government regulations were based on a 220-pound man's head, not a child's head. This is one reason why the American Academy of Pediatrics has repeatedly written to the FCC and FDA calling for more protective laws ([Ghandi 2012](#), [AAP 2012 & 2013](#)).
- **A lifetime of exposure:** Children will receive a greater cumulative exposure than adults ([Belpomme et. al, 2018](#), [Miller et al, 2019](#)).

Questions to Consider Before Greenlighting Virtual Reality in the Pediatric Population.

- Where is the up-to-date research review and risk analysis on impacts to a child's developing brain and eyes from radiofrequency radiation exposure?

- In light of the research on oxidative stress and brain damage what could the potential health impacts be from the FDA policy allowing radio frequency radiation brain exposures from virtual reality to medically vulnerable pediatric patients?
- What are the actual radiofrequency radiation exposures into children's brains, bodies and eyes from VR in medical settings? Will there be any monitoring of dose and length of exposures?
- What are the radiofrequency exposures for patients with metal implants ? As research shows metal implants can impact the exposure levels, will there be screening for patients to ensure they do not have metal implants which could impact their exposure?
- Will there be any monitoring of reported side effects from radiofrequency radiation exposures from VR used in the pediatric population and how will that data be collected and analyzed?
- How can the FDA transparently communicate the level of their review regarding radiofrequency radiation and the uncertainty about long term safety of Virtual Reality for pediatric patients?
- Will patients and their families be fully informed of the science indicating adverse biological effects from low level radiofrequency radiation? Are these patients able to consent in an informed way to the risks and to weigh those risks against the benefits?
- How will outcomes be measured and will an analysis be done to weigh any benefit to the risk of radiofrequency radiation a child patient's future health?

The issue of radiofrequency radiation exposure and safety to the developing brain of a child needs to be prioritized by the FDA. Here are some recent research studies that the FDA should be considering:

- In 2021, the Environmental Working Group published a study in *Environmental Health* analyzing the findings of tumor and heart damage from the National

Toxicology Program study and concluded that FCC limits should be strengthened by 200 to 400 times to protect children according to current risk assessment guidelines ([Uche 2021](#)).

- In 2021, the European Parliament requested a research report “[Health Impact of 5G](#)” released in July 2021 concluding that commonly used RFR frequencies (450 to 6000 MHz) are probably carcinogenic for humans *and* clearly affect male fertility with possible adverse effects on the development of embryos, fetuses and newborns.
- **February 2020-** Scientists of the National Institute of Environmental Health Sciences National Toxicology Program published a study finding “significant increases in DNA damage” in groups of male mice, female mice and male rats after just 14 to 19 weeks of exposure to RFR ([Smith-Roe et al., 2020](#)).
- **March 2020-** Yale researchers published a study supported by the American Cancer Society linking thyroid cancer to cell phone use in people with a type of common genetic variation ([Luo et al., 2020](#)).
- **May 2020-** A meta analysis of 300 peer-reviewed scientific publications (1990-2015) describing 1127 experimental observations in cell-based in vitro models on RFR published in *Environmental Research* found less differentiated cells such as epithelium and spermatozoa are more sensitive to RF ([Halgamuge et al., 2020](#)).
- **May 2020-** A review on real world exposure to 5G published in *Toxicology Letters* found that 5 G will have systemic effects as well as adverse effects to the skin and eyes ([Kostoff et al., 2020](#)).
- **November 2020-** A systematic review and meta-analysis of case-control studies found evidence that linked cellular phone use to increased tumor risk ([Choi et al., 2020](#)).
- **March 2021-** The Switzerland Institute of the Environment expert published review found increased oxidative stress in the majority of animal studies and cell studies with exposures within regulatory limits ([Schuermann et al., 2021](#)).
- **July/August/November 2021-** Research ([Hassanzadeh- Taheri et al., 2022](#)) and systematic reviews find harm to sperm ([Yu et al., 2021](#), [Kim et al., 2021](#), [Negi and Singh 2021](#))
- **August 2021-** A review on impacts to the thyroid found RFR might be associated alterations in thyroid hormone levels, with a possible disruption in the hypothalamic-pituitary-thyroid axis ([Alkayyali et al., 2021](#))
- **August 2021-** 2400 MHz affects the structural integrity of the hippocampus in mice ([Hasan et al., 2021](#)).
- **August 2021-** A review summarizes the effects of EMR on the neurotransmitters in the brain ([Hu et al., 2021](#)).

- **August 2021-** Review on RFR and the brain published in the International Journal of Radiation Biology found the threshold for an effect in EEG is far lower than the level deemed safe by the U.S. FCC ([Hinrikus et al. 2021](#)).
- **September 2021-** A systematic review on the effects of RFR to male reproductive hormones found that wireless can decrease testosterone ([Maluin et al. 2021](#)).
- **September 2021-** A review on the genetic effects of non-ionizing electromagnetic fields found DNA strand breaks, micronucleus formation, and chromosomal structural changes ([Lai 2021](#)).
- **September 2021-** A systematic review published in the Annals of the New York Academy of Sciences found that neuronal ion channels are particularly affected ([Bertagna et al 2021](#)).
- **October 2021-** A review in the International Journal of Oncology describes how EMFs lead to dysfunction of ion channels which lead to reactive oxygen species/free radical overproduction providing “a complete picture” of how exposure may indeed lead to DNA damage and related pathologies, including cancer,” ([Panagopoulos et al. 2021](#)).

On August 13, 2021, the United States Court of Appeals for the District of Columbia Circuit made [a judgment](#) in our case and ruled that the **FCC had failed to show** that its re-affirmation of those 25-year-old wireless radiation limits was based on a reasoned evaluation of the relevant scientific evidence because it ignored record evidence about children's vulnerability, non-cancer effects, impacts to wildlife and the environment, and the effects of long-term exposures. Importantly, the Court [found](#) that the FCC had improperly relied on FDA's “conclusory statements” regarding RFR and health - **the very same statements we document in this Declaration as misrepresentations**<sup>1</sup>. The court stated the FDA’s statements “*represent a failure by the FDA to address the implication of Petitioners’ studies: The factual premise—the non-existence of non-thermal biological effects—underlying the current RF guidelines may no longer be accurate.*”

The FDA’s subsequent 2020 release of “[Review of Published Literature between 2008 and 2018](#)” further proved that the FDA’s conclusion of no harm is unsubstantiated by FDA review, because the FDA’s literature review was limited to cancer and cell phones only. It did not include a review of the literature on non-cancer health effects (brain damage, oxidative stress, reproductive harm, etc.), and did not include a review of cell tower studies or environmental effects. Importantly, the FDA’s 2020 literature review was not a risk assessment nor hazard identification report and it had numerous inaccuracies

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<sup>1</sup> The FCC cited three statements by the FDA as substantiating their determination: a [2/2018 FDA statement](#) (saying the “totality” of the research shows no harm, a [4/2019 FDA letter](#) (with one paragraph discounting the relevance of the NTP results), and the 12/4/2019 dated FDA website page “[Do cell phones pose a health hazard?](#)” (which does not reference the FDA research review).

- inaccuracies which remain uncorrected to this day. **Yet the FDA misleadingly presents this review as proof of safety.**

**Myth: The Food And Drug Administration (FDA) has reviewed the science on 5G and cell towers and determined the radiation is safe and FCC limits protect public health.**

**What the Public and Policymakers Inaccurately Assume:** The FDA's [website](#) clearly shows that the FDA has reviewed the totality of scientific evidence and found cell phones, 5G and cell towers are safe. After all, the FDA [concluded](#) in February of 2020 that "there is no consistent or credible scientific evidence of health problems caused by the exposure to radio frequency energy emitted by cell phones."

**Fact:** The FDA has never evaluated the totality of the science to conclude any opinion on the safety of human exposure to 5G technology or cell tower radiation. All the FDA has done is release a now outdated literature review, concluding in 2018, focused solely only on cell phones and cancer. This literature review omits studies on damage to DNA, the brain and reproduction. The FDA literature review is not a systematic review, nor is it a risk analysis, nor is it an evaluation of FCC cell tower radiation limits, despite being presented in this way.

**Fact:** The FDA has no authority in regards to cell tower radiation and 5G infrastructure. This was confirmed in a January 11, 2022 letter by Ellen Flannery of the Director of the FDA Office of Policy Center for Devices and Radiological Health, who wrote that the FDA doesn't regulate cell towers. When asked about the safety of a cell tower outside a California mother's window, she responded, "The FDA does not regulate cell towers or cell tower radiation. Therefore, the FDA has no studies or information on cell towers to provide in response to your questions." [Link to FDA Letter.](#)

While the public might assume the FDA is always monitoring the science and monitoring exposures, this is inaccurate. For example, the [2021 FDA's Annual report](#) was released on January 31, 2022, and there is no mention of the issue of cell phones or cell towers or wireless electromagnetic radiation. The FDA has not shown any evidence of monitoring research with new agency reports, meetings or budget on the issue.

As the Pittsburgh Law Review [article](#) concludes, "The FCC and FDA have failed in their obligation to prescribe safe RFR guidelines produced from wireless communication devices to protect the public's health and safety."

## Additional Documentation

- The Government Accountability Report on 5G ([GAO 2020](#)) clarified that the FDA and other organizations “only reviewed a subset of the relevant research” and stated in regards to the FDA Literature Review that “The assessment focused on cancer-related animal and human studies of frequencies below 6 GHz.”
- Not only did the FDA do a limited literature review looking *only at cancer*, but it omitted impacts to the brain, oxidative stress, and reproduction. It omitted evaluation of children’s unique vulnerability. Most importantly it discounted the results of the National Toxicology Program, which is why [numerous scientists — including](#) several now retired US government scientists — are calling for the FDA to retract the review, as it offers unsubstantiated assurance of safety ([EHT 2020](#)).
- EHT’s 150 page report “[FDA's Misleading Information on Cell Phone Radiation](#) documents the lack of adequate research review and misleading information put forward by the FDA.
- In 2020, the FDA [refused to testify](#) to the New Hampshire State Commission on 5G and refused to answer specific questions regarding its purported review of health effects of 5G and wireless networks. Although the FDA responded with a few general sentences about how “FDA’s doctors, scientists and engineers continually monitor the scientific studies and public health data for evidence that radio frequency energy from cell phones could cause adverse health effects, “the FDA refused to answer specifics such as providing reports or answering questions about the safety margin, and the FDA’s research activities. [Read FDA Communications with the New Hampshire 5G Commission](#)

Fact: The FDA is aware that FCC limits can be exceeded when phones are tested in body contact position and well aware that the public has no idea of this fact. The FDA knowingly allows the American public to be exposed to RFR/EMF levels in excess of the regulatory limit, yet the FDA’s [website pages](#) have images of smiling people with cell phones against their heads — communicating the message that phones are safe near the body. The FDA website does not have any warnings to the public explaining that all cell phone manufacturers have [special instructions](#) — fine print warnings — buried deep in the cell phone manuals that say to keep the phone at a specified distance away from the body: from 5 to 25 millimeters (¼” to 1”).

[See the fine print warnings here.](#)

The FDA says there is “a large safety margin” that is protective, yet cannot answer our repeated requests to define *how large the safety margin is*, nor at what RFR level past

the FCC regulatory limit the FDA would act to enforce the limit or warn the public. The FDA shows no review of recent research to even determine at what level above the FCC limits the FDA would act. The FDA lack of clarity on the threshold of harm it subscribes to has resulted in the current situation where people of all ages carry phones in body contact positions day and night, and pregnant women rest wireless devices on their abdomen, unaware that they could be exposing their fetus to RFR/EMF which violates FCC exposure limits.

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The Centers for Disease Control and Prevention (CDC) has concluded 5G, cell towers and cell phones are safe.

**Myth:** The [CDC website statements](#) that “we do not have the science to link health problems to cell phone use” confirm that cell phones and towers are safe.

**Fact: CDC experts have not reviewed the latest research on wireless radiation and the website pages do not reflect an opinion or determination on safety.**

1. First, and most importantly, there are no scientific reports by the CDC on wireless safety, nor does the agency have staff with expertise monitoring the science and evaluating risk. As far as we know they have never undertaken any research review as the CDC has no authority on the issue.
2. In fact, due to the lack of CDC scientists with subject matter expertise in wireless, the agency hired an outside consultant to help draft several CDC webpages. This individual has longstanding financial ties to the industry and consults for cellular companies. The pages he helped draft at the CDC omits all scientific research that has found health effects and the text downplays any health risk. [Read the EHT expose on the CDC industry tied consultant here.](#)
3. In 2014, the CDC actually posted cautionary statements that recommended people reduce cell phone radiation exposure. However, these statements were removed just a few weeks after they were posted. [Read the New York Times article](#) which tells part of the story, as well as the [Microwave News article on influence to the CDC webpage from wireless industry consultants.](#)
4. Of note: A now retired top CDC expert now states that the research shows cell phone radiation likely causes cancer. Chris Portier PhD, retired CDC Director of the National Center for Environmental Health and former Director of the Agency for Toxic Substances and Disease Registry submitted a [scientific research review](#) in a major cell phone/brain cancer lawsuit where he concludes that “the evidence of an association between cellular phone use and the risk of glioma in adults is quite strong.”

Excerpts from Examples of FDA's misrepresentations that they have done a science based review of the FCC RFR limits to make a determination that FCC's limits are protective of public health.

September 9, 2019 [FDA Letter to Merkley and Eshoo](#) clearly states that the FDA reviewed the science and the RFR limits to determine if they were adequate.

*"We appreciate the opportunity to provide an overview of the substantial body of evidence that has informed our determination that the current safety standard for RFR exposure remains appropriate."*

*"FDA's conclusion that the current safety limits for cell phone RFR exposure remain acceptable for protecting the public health is supported by the considerable body of peer-reviewed scientific publications."*

The FDA's online webpage "[Scientific Evidence for Cell Phone Safety](#)"<sup>2</sup> states:

*"The state of scientific knowledge continues to demonstrate that: The current limit on radio frequency (RF) energy set by the [Federal Communications Commission remains acceptable for protecting](#)<sup>3</sup> the public health. The FDA recently provided an updated assessment of the current limits based on the currently available scientific evidence (see [Letter from the FDA to the FCC on Radiofrequency Exposure](#)..."<sup>4</sup>*

The FDA's [April 24, 2019](#)<sup>5</sup> letter submitted to the FCC regarding RFR human exposure limits has only one paragraph on the issue, concluding:

*"the available scientific evidence to date does not support adverse health effects in humans due to exposures at or under the current limits, and that the FDA is committed to protecting public health and continues its review of the many sources of scientific literature on this topic."*

The [October 18, 2017 email from FDA's Kassiday to Scarato](#)<sup>6</sup> states:

*"The current safety limits established by the FCC are adequate to protect the public based on the peer reviewed literature."*

*"Currently we believe that the safety limits are adequate to protect the public."*

The National Cancer Institute presented to the New Hampshire State Commission on 5G in a 7/16/2020 email that the FDA had done an assessment of US RFR limits.

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<sup>2</sup> Health, Center for Devices and Radiological. "Scientific Evidence for Cell Phone Safety." FDA, FDA, Feb. 2020. [www.fda.gov, https://www.fda.gov/radiation-emitting-products/cell-phones/scientific-evidence-cell-phone-safety](https://www.fda.gov/radiation-emitting-products/cell-phones/scientific-evidence-cell-phone-safety).

<sup>3</sup> "Radio Frequency Safety." *Federal Communications Commission*, 2 Mar. 2011, <https://www.fcc.gov/general/radio-frequency-safety-0>.

<sup>4</sup> "Letter from the FDA to the FCC on radiofrequency exposure." (April 14, 2019) <https://www.fda.gov/media/135022/download>.

<sup>5</sup> "FDA letter to Mr. Julius Knapp Chief Office of Engineering and Technology." U.S. Federal Communications Commission. (April 24, 2009). <https://ecfsapi.fcc.gov/file/10815418118189/13-84.pdf>.

<sup>6</sup> "Email from FDA's Kassiday to Scarato." (October 18, 2017) <https://ehtrust.org/wp-content/uploads/FDA-communications-Scarato-PDF-2019.pdf>



*“The FDA recently provided an updated assessment of the current limits of RF energy based on the currently available scientific evidence (see Letter from the FDA to the FCC on Radiofrequency Exposure).” ([page 38 of New Hampshire Commission Report on 5G](#))<sup>7</sup>*

The FDA’s [2020 letter to U.S. Senator Baldwin](#)<sup>8</sup> states:

*“Based on this **extensive risk analysis**, our determination remains consistent that there is no scientific evidence that warrants a change in cell phone safety limits, and that there is insufficient evidence to demonstrate a causal link between cell phones and cancer in the population. We believe that all of the questions contained in your constituent’s letter are answered in the publicly available information, and I have included links below to the relevant information.”*

The [FDA’s letter to Eshoo and Merkley](#) creates the illusion that a risk assessment was done, stating:

*“The gold standard for the assessment of risk to public health remains the data and information that is available from studying effects on humans. Animal and laboratory studies can provide useful scientific information, but data on human health is the most informative where it is available. In the case of cell phone handsets, there is abundant evidence to support FDA’s conclusion from epidemiological studies, public health surveillance data and supportive laboratory studies. The information on which FDA has based its conclusion is summarized below, together with a description of the methods that the Agency uses for undertaking risk analysis and other relevant scientific information.”*

Evidence that FDA’s representation that it evaluated FCC limits is erroneous.

The only FDA report on cell phone radiation the FDA has publicly presented is the 2020 literature review and it fails to meet even the minimum criteria for being a review of the FCC human exposure limits. First and foremost, the FDA’s literature review is void of information on the actual [FCC regulations](#) for cell phone radiation. The FCC requires mobile phone manufacturers to demonstrate compliance with an SAR level of 1.6 watts per kilogram (averaged over one gram of tissue) but this is not mentioned anywhere.

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<sup>7</sup> “Page 38 of New Hampshire Commission Report on 5G.” (November 1, 2020). <http://www.gencourt.state.nh.us/statstudcomm/committees/1474/reports/5G%20final%20report.pdf>.

<sup>8</sup> “FDA’s Letter to US Senator Tammy Baldwin.” (September 09, 2020) [https://ehtrust.org/wp-content/uploads/FDA-9\\_10\\_-2020-Letter-Senator-Tammy-Baldwin-.pdf](https://ehtrust.org/wp-content/uploads/FDA-9_10_-2020-Letter-Senator-Tammy-Baldwin-.pdf)

There are no tables with the studies comparing the various exposure levels in research studies to the FCC limits. The FCC human exposure testing and rules on laptops, tablets, Wi-Fi routers, smart speakers and wireless printers are not even mentioned. (While the FDA does mention *whole body limits* in reference to the NTP study, these are not the same as the localized FCC limit used for premarket cell phone compliance tests.)

In addition, the FDA also does not mention any determination on the adequacy of cell phone testing protocols- a key part of FCC rules on human exposure.

In order to determine if FCC limits are adequate, the FDA should have followed a stated methodology for example, identified a list of risk assessment-quality studies and identified a no observed adverse effect level based on a weight-of-evidence evaluation on recent science. The FDA should have shared what the safety margin is and how it remains appropriate based on an up to date assessment of the totality of science. Yet no evidence of an evaluation of FCC limits exists.

As documented in detail earlier in our section "[The 2020 Literature Review is not a risk assessment](#)" the literature review does not even meet best practices for systematic review and human health assessments, much less basic requirements of a safety review of FCC limits.

In [correspondence with Scarato \(page 31\)](#)<sup>9</sup> about the FDA's refusal to act on this issue after being presented numerous research studies showing harm, FDA's Daniel Kassiday, Radiation Safety Engineer at U.S. Food and Drug Administration referenced an European SCENIHR Report. When Scarato asked, "Is the FDA's stance to consider the SCENIHR opinion as the FDA's opinion?" the FDA responded, "the FDA comes to its own conclusions."

**In short, the FDA specifically states that the FDA itself makes its own determinations. Yet the FDA has not publicly shown any evidence of a science-based method to make a determination on RF limits.**

In sharp contrast to the FDA's lack of action or methodology, a 2021 [study](#)<sup>10</sup> by the Environmental Working Group published in the journal Environmental Health used benchmark dose modeling as an approach to develop health-based exposure limits for RFR based on animal toxicology data from the NTP study. Their analysis suggests a limit of 0.2–0.4 mW/kg whole body SAR for young children, *far far lower than FCC whole body SAR limits*.

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<sup>9</sup> "FDA Response to Scarato." (January 09, 2019)

<https://ehtrust.org/wp-content/uploads/FDA-communications-Scarato-PDF-2019.pdf>

<sup>10</sup> Uche, U.I., Naidenko, O.V. "Development of health-based exposure limits for radiofrequency radiation from wireless devices using a benchmark dose approach." *Environ Health* 20, 84 (2021).

<https://doi.org/10.1186/s12940-021-00768-1>

Fact: The FDA shows no documented evidence of regular research reviews nor regular research monitoring. The FDA publicly states that the agency will act if credible science shows harm but has never defined what it deems as credible, nor the process by which they evaluate or monitor the RFR issue.

There are no monthly or yearly reports, no research updates and no publicly available notes or agendas from meetings on the issue of RFR. Emails and letters to and from the FDA *over the years* have not shown a transparent process where the FDA lists and evaluates research studies. For example, there was no public report on the website *until 2020* when the Literature Review was released. Nor have any emails or letters had any reference to an FDA report until 2020. Furthermore, the FDA website remained unchanged for years and was not updated until February 2020 despite numerous published studies showing adverse effects.

If the FDA is engaged in “continuous” monitoring of the science, the FDA’s method and process have been kept a secret from the public.

Examples of the FDA’s misrepresentation that they “continuously monitor” the science.

FDA’s online webpage “[Scientific Evidence for Cell Phone Safety](#)” states:

*“The FDA’s doctors, scientists and engineers continually monitor the scientific studies and public health data for evidence that radio frequency energy from cell phones could cause adverse health effects. If a credible risk is detected, the FDA will work closely with other federal partners to mitigate the risk.”*

In a July 15, 2020 letter to the New Hampshire Commission ([found in the New Hampshire Commissions 5G Report page 41](#)) the FDA stated:

*“FDA’s doctors, scientists and engineers continually monitor the scientific studies and public health data for evidence that radio frequency energy from cell phones could cause adverse health effects.”*

In the September 9, 2019 [FDA Letter to Representative Eshoo](#) the FDA states, “FDA will continue to monitor scientific information as it becomes available regarding the impacts of 5G.”

Scientific research has been published after the FDA literature review time frame. Yet the FDA has not shared these studies with the public, nor reviewed the research in public documents.

Fact: The FDA repeatedly and inaccurately states there is “scientific consensus” that cell phones are safe despite the fact that the FDA is fully aware that hundreds of scientists and thousands of medical doctors are warning that the science indicates serious health effects and they recommend that the public *should* reduce exposure. The FDA also states that there is a scientific consensus that cell phones specifically do not cause cancer despite the fact that numerous authors in numerous published papers conclude RFR is a carcinogen.

As Dr. Ronald Melnick, now retired from 28 years as an NIH scientist, states in his letter to the FDA:

“The statement on the FDA website (<https://www.fda.gov/radiation-emitting-products/cell-phones/do-cell-phones-pose-health-hazard>) that there is a “scientific consensus on cell phone safety” is totally wrong and should be removed since there is no scientific consensus supporting this claim. In contrast, numerous experts in the field have reported evidence that current levels of cell phone radiation can be harmful to human health.”

## Examples of FDA’s misrepresentation of “scientific consensus”

FDA’s website page “[Do Cell Phones Pose a Health Hazard?](#)”<sup>11</sup> has a section entitled:  
*“Scientific Consensus on Cell Phone Safety”*

Another FDA website page “[Radio Frequency Radiation and Cell Phones](#)”<sup>12</sup> states:  
*“Scientific consensus shows that non-ionizing radiation is not a carcinogen and, at or below the radio frequency exposure limits set by the FCC, non-ionizing radiation has not been shown to cause any harm to people.”*

Documentation that FDA’s statement of “scientific consensus” is unfactual.

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<sup>11</sup> “Do cell phones pose a health hazard?” U.S. Food and Drug Administration. (2020)  
<https://www.fda.gov/radiation-emitting-products/cell-phones/do-cell-phones-pose-health-hazard>.

<sup>12</sup> “Radio Frequency Radiation and cell phones.” U.S. Food and Drug Administration. (2020)  
<https://www.fda.gov/radiation-emitting-products/cell-phones/radio-frequency-radiation-and-cell-phones>.

Many scientists state scientific evidence is now sufficient to trigger protective action by the FDA citing a mounting body of credible published research has linked RFR exposure to numerous effects including: [genetic damage](#), [oxidative stress](#), [damaged sperm](#), [brain cancer](#), [thyroid cancer](#), [altered brain development](#), [memory damage](#), and [impacts to the endocrine](#), and [reproductive](#) systems. Yet the FDA does not even cite or reference that such a body of evidence even exists and the FDA inaccurately states that there is a “scientific consensus” for safety. Thousands of doctors, scientists and medical organizations are calling for urgent action on RFR due to the body of scientific evidence showing harm.

Over 3,500 doctors and scientist have [signed](#)<sup>13</sup> onto the [2020 Consensus Statement of UK and International Medical and Scientific Experts](#)<sup>14</sup> calling for an “immediate moratorium on 5G, wireless smart metering and any other new RF emissions” as well as the “establishment of public safety limits to be biologically protective against adverse health effects” because of the “exponential increase in ambient radiofrequency radiation.” The consensus statement reads:

*“In truth, we are now beyond the point of precaution and protection of vulnerable groups is an emergency. RF has been shown to cause widespread, multisystem health detriment and effects on the immune system have been demonstrated in some peer-reviewed published studies.”*

There have been appeals and position statements [for decades](#)<sup>15</sup>. For example, the [International EMF Scientist Appeal](#)<sup>16</sup> by 255 scientists from 44 countries who have published specifically on bioelectromagnetics in the peer-reviewed literature have collectively petitioned the WHO and the UN for immediate measures to reduce public exposure and create protective safety limits.

In Europe, over 400 scientists and medical doctors signed onto the [5G Appeal](#)<sup>17</sup> calling for a halt to 5G infrastructure because “RF-EMF has been proven to be harmful for humans and the environment.”

In [April](#)<sup>18</sup> and September of 2021 scientists sent letters to President Biden with 12 recommendations, accompanied by a [scientific briefing](#) on the health and environmental effects of 5G that has now been sent to policymakers worldwide. Earlier, in 2019, US medical professionals sent a [letter to President Trump](#)<sup>19</sup> calling for urgent action on 5G and wireless networks.

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<sup>13</sup> [“Doctors & Scientists Appeals for Stronger Electromagnetic Radiation Regulations.”](#) (May 17, 2017)

<sup>14</sup> [“2020 non-ionising radiation consensus.”](#) (October 11, 2020)

<sup>15</sup> [“Doctors & Scientists Appeals for Stronger Electromagnetic Radiation Regulations.”](#) (May 17, 2017)

<sup>16</sup> Redazione, L. “International Appeal: Scientists Call for Protection from Non-Ionizing Electromagnetic Field Exposure”. *European Journal of Oncology and Environmental Health*, vol. 20, no. 3/4, Dec. 2015, pp. 180-2, <https://www.mattioli1885journals.com/index.php/EJOEH/article/view/4971>.

<sup>17</sup> [“EHT Open letter. An Overview of the Health and Environmental Effects of 5G, 4G and Wireless Radiofrequency Radiation.”](#) (April 2021)

<sup>18</sup> [“Letter to Biden on Infrastructure/FCC from Environmental HealthTrust.”](#) (April 21, 2021)

<sup>19</sup> [“Dozens of US Doctors and Healthcare Practitioners send letter to President Trump calling for a Moratorium on 5G Press Release.”](#) (December 13, 2019)

## Children Absorb 2-5 Times Higher Doses of Microwave Radiation than Adults, From Virtual Reality Systems

*Experts warn that injuries to vision, hearing and brain could prove irreversible*

June 5, 2018

(Washington DC) In an innovative [study](#) published today in *Environmental Research*, researchers simulated microwave radiation from Virtual Reality (VR) with a video-streaming cell phone in a cardboard box placed in front of the eyes. Specific areas of the eyes and critical parts of the brain absorbed between 2 to 5 times more cell phone radiation in the youngest child model compared to the adult model. Children's health specialists are concerned that higher exposures to unprecedented levels of microwave radiation pose risks of permanent damage to vision, hearing and brain development, and cancer.

This [publication](#) is the first to extend FDA computer-based anatomical modeling used for surgical devices to examine absorption of microwave radiation from cell phones held in virtual reality positions. The researchers also investigated microwave radiation with the phone at ear contact. They found that a 3-year old child absorbs about twice as much radiation into the cerebellum, and up to thirtyfold more into the hippocampus—the part of the brain central to memory, emotions, and impulse control.

“When we first began to model cellphone exposures in the brains of toddlers and young children years ago, I never imagined we would see phones placed directly in front of the eyes as children are doing now,” noted study author Professor Claudio Fernandez of the Federal Institute of Rio Grande do Sul, who has previously published several key [papers](#) on children's radiation absorption. The researchers initiated this study because children are increasingly using VR systems, that were never evaluated for their health impact.

“Children's vision, brain and hearing could be permanently impaired by this untested radiation,” stated Devra Davis Ph.D., MPH, a study co-author, and President of Environmental Health Trust (EHT). “This study shows children's eyes absorb significant amounts of radiation. Children are more vulnerable because their eyes are still developing. Early life insults could mean earlier vision decline. In addition, the eyes contain few blood vessels, so they have no way to cool off.”

The new paper notes that experimental studies show that prenatally exposed animals produce offspring with impaired brain growth. “In a published [review](#), the majority of studies found that children do absorb relatively higher doses of microwave radiation from mobile phones than adults. The long-term ramifications of such exposures need to be addressed,” stated co-author Robert Morris M.D., Ph.D., EHT Senior Medical Advisor.

“Two-way microwave radiation transceivers, in the form of Smartphones, should not be used directly in front of children’s eyes and brains,” cautions University of Utah [Prof. Om Gandhi](#), an electrical engineer who is one of the original developers of cell phone testing protocols.

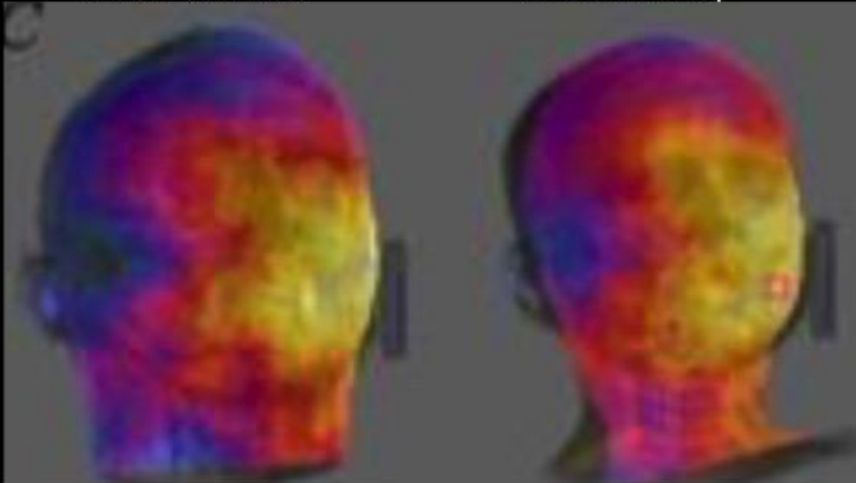
“Current cell phone compliance testing does not account for children’s physiology. This new research highlights the importance of realistic modelling of radiation into the different tissues of the eyes and brain. Equally important, there needs to be pre-market testing and modeling of phones in the new ways that people are using phones, such as directly in front of the face as is done with these smartphone enabled virtual reality systems.”

“[The American Academy of Pediatrics](#) along with the Health Departments of Connecticut, [California](#) and [Maryland State Advisory Board on Children’s Health](#) recommend prudent measures should be taken to reduce wireless radiation exposure to children. Cardboard virtual reality holders are [marketed](#) to parents and school administrators who are unaware of the risks to children’s health,” stated Theodora Scarato Executive Director of Environmental Health Trust.

## Microwave Radiation From Cell Phone

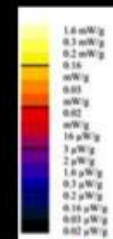
34 Year Old Man

6 Year Old Boy



Simulation of microwave radiation from smartphone.

Scale is 50 dB  
Yellow = highest



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Another study author, Meg Sears, associate at the Ottawa Hospital Research Institute in Canada, and Chair of Prevent Cancer Now, stated: “Children should be protected from microwave radiation. For any wireless device, using airplane mode after an adult downloads the program will greatly reduce microwave radiation.” She added, “The same radiation powering communications is used in chemical industries and products to accelerate reactions. This is efficient in commercial biochemistry, but can spell trouble during sensitive brain development.”

“The French government has just [recalled](#) thousands of cell phones because their tests found most cell phones exceeded current test limits for radiation by as much as four fold,” stated Davis referring to the recent large scale cellular phone recalls and software updates ([Echo Star Plus](#), the [Alcatel PIXI 4](#), the [Honor 8](#), the [Neffos X1](#) and the [Hapi30, Orange](#).) She stated that even more recalls are expected as the European Union has updated their cell phone testing protocols after the government of France [released](#) hundreds of cell phone radiation tests that [measured](#) excessive radiation exposures when the phone was tested in contact with the body. The release of the test data followed pressure from the [Phonagate Alert Association](#).

“Studies of the developing brain have led the Centers for Disease Control (CDC) and Prevention and the U.S. Environmental Protection Agency to issue guidelines



to keep toxic exposures to lead and other agents as low as feasible during childhood,” commented Dr. Davis, a former Senior Advisor to the CDC Lead Poisoning Advisory Committee and the National Institutes of Health (NIH). “We require special seatbelts and carseats as well as bike helmets for the young, recognizing that they merit greater protection. It makes no sense to assume that they can safely be exposed to levels of radiation that have never been evaluated for their long-term impacts on growth and development, especially in light of growing evidence that such radiation can damage plants, migrating insects, and other animals, and increase the risk of cancer,” she noted.

Fernández, A.A. de Salles, M.E. Sears, R.D. Morris, D.L. Davis, *Absorption of wireless radiation in the child versus adult brain and eye from cell phone conversation or virtual reality*, Environmental Research, Available online 5 June 2018, ISSN 0013-9351, <https://doi.org/10.1016/j.envres.2018.05.013>.

(<https://www.sciencedirect.com/science/article/pii/S0013935118302561>)

### **About Environmental Research**

Environmental Research publishes original reports describing studies of the adverse effects of environmental agents on humans and animals. The principal aim of the journal is to assess the impact of chemicals and microbiological pollutants on human health. Both in vivo and in vitro studies, focused on defining the etiology of environmentally induced illness and to increase understanding of the mechanisms by which environmental agents cause disease, are especially welcome.

Investigations on the effects of global warming/climate change on the environment and public health, as well as those focused on the effects of anthropogenic activities on climate change, are also of particular interest.

### **About Environmental Health Trust**

EHT is a scientific virtual think tank conducting cutting-edge research on environmental health risks with some of the world’s top researchers. EHT educates individuals, health professionals, and communities about policy changes needed to reduce those risks. EHT maintains a regularly updated [database](#) of worldwide precautionary policies: more than a dozen countries recommend reducing wireless exposure to children.