IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW MEXICO

SANTA FE ALLIANCE FOR PUBLIC HEALTH AND SAFETY, ARTHUR FIRSTENBERG, and MONIKA STEINHOFF,

Plaintiffs,

vs. No. 1:18-cv-01209-LF-JHR

CITY OF SANTA FE, NEW MEXICO; HECTOR BALDERAS, Attorney General of New Mexico; and the UNITED STATES OF AMERICA,

Defendants.

AFFIDAVIT OF SHARON GOLDBERG, MD

State of New Mexico

County of Santa Fe

I, Sharon Goldberg, declare as follows:

1. I am a resident of the City of Santa Fe, New Mexico and a medical doctor licensed to practice in New Mexico and Florida. I received a BA in Biology from Smith College in 1992 and an MD from Tel-Aviv University Sackler School of Medicine (Israel) in 1997. In 2005, I completed training in Tropical Medicine at the Gorgas Memorial Institute of Tropical Medicine in Lima, Peru and received a DTM&H.

2. I am board certified in Internal Medicine since 2000.

3. I practiced Internal Medicine from 2001-2015[1] as an academic Hospital Medicine physician, with full time faculty appointments at the following institutions: The Mount Sinai Hospital/Mount Sinai School of Medicine, New York (2001-2005), Beth Israel Medical

[1] Please see C.V. for exact employment dates and details. I was overseas for part of 2005 (DTM&H training), and part of 2006 (southeast Asia). I also worked in two medically underserved areas in the U.S. while in between academic jobs.

Center/Albert Einstein College of Medicine (AECOM), New York (2006-2011), and the University of Miami Miller School of Medicine, Miami (2011-2015).

4. I was Assistant Professor of Medicine from 2006-2015 (AECOM and University of Miami). During these years I: evaluated and managed a large volume of patients with chronic disease, both in and out of hospital, and worked as a medical educator, responsible for training hundreds of medical students and residents.

5. A copy of my curriculum vitae is attached as Exhibit 1.

My interest in health effects of non-ionizing radiation

6. While working at the University of Miami, my division provided all faculty with a free cell phone. After many years of using a BlackBerry, I requested to change to an iPhone so I could use the medical applications my residents and students used on our daily rounds. After a 20 minute phone call with the new phone on speaker, my right middle fingertip became numb and began to burn with neuropathic pain, lasting nearly a week.

7. That night I began to read the medical literature on health effects of wireless radiation. I was shocked to see decades of solid evidence linking "diseases of civilization" with exposure to man-made electromagnetic fields (EMF's), yet total disconnect between the published science, medical education and clinical practice.[2] The following morning, I brought the phone back to my administrator and requested a phone that emitted less radiation based on specific absorption rate (SAR – the measure of absorbed radiation in Watts/Kg – used to measure radiofrequency radiation (RFR)[3] exposure from a source close to the body, like a cell phone). I was given the replacement lower radiation phone soon after and used it without issues.

[2] For purposes of this affidavit, I chose the term "electromagnetic fields" for readability and am specifically referring to frequencies in the telecommunications range.
[3] Radiofrequency radiation is defined as electromagnetic energy in the frequency range of 3 kilohertz to 300 gigahertz.

8. In July 2015, I resigned from the University of Miami and started an Integrative Internal Medicine practice. Integrative medicine applies evidence based medical practices with a focus on finding the root causes of illness. Lifestyle modification is the preferred initial intervention and prescription medications are used, but avoided as first line treatments, unless absolutely indicated. Approaches used included: diet, exercise, stress reduction, and other lifestyle modifications.

9. I saw a growing number of patients with chronic fatigue, autoimmunity, neuropsychiatric conditions and diabetes who continued to deteriorate despite optimal medical therapy. Several patients noticed clinical improvement after they removed wireless devices from their homes.

10. To better understand EMF science and learn to use professional meters, I began coursework with the Institute for Building Biology and Ecology. To date, I have completed the two core EMF courses for certification as EMRS (Electromagnetic Radiation Specialist/Building Biologist):

a. IBE 212 Electromagnetic Radiation

b. IBE 312 Advanced Electromagnetic Radiation

11. With this training I learned professional EMF assessment and remediation strategies that helped me understand the science behind my patient's reports of symptom improvement after reducing home EMF exposure.

12. Because many of my patients worked with a building biologist to evaluate and reduce home EMF exposure, I was able to see the clinical effects of this intervention. This is a partial list of conditions I commonly saw improve after a successful EMF lowering intervention in the patient's home:

a. Fatigue

b. Insomnia and other sleep derangements, including obstructive sleep apnea

c. Headaches

d. Anxiety, depression, brain fog, concentration issues

e. Behavioral issues in children

f. Diabetes

g. High blood pressure

Research qualifications

13. I have co-authored peer-reviewed publications in the fields of nutrient supplementation, nutrition, and autonomic nervous system assessment. As such, I have experience with clinical research on multiple levels, including but not limited to: study design, implementation and interpretation of results.

14. I am a peer reviewer in the field of medicine, and a current Editorial Board Member of the journal *Electromagnetic Biology and Medicine.*

15. I have years of experience teaching medical students and residents Evidence Based Medicine (EBM), and applying it in my own practice to solve clinical and research questions.

16. My research interest is chronic disease and the unprecedented deterioration of personal and public health seen over the past two decades. As a result of this interest, I have personally reviewed the literature on EMF's and health.

Microwave radiation is an environmental toxin – plain and simple

17. The basic science demonstrates that RFR harms living cells and interrupts essential housekeeping functions (homeostasis) of living organisms. Harm is observed at levels a

fraction of those deemed acceptable per current, non-biologically based guidelines.[4] The following is only a partial list of documented RFR bioeffects – many more are described in the literature.

a. Oxidative stress or "free radical damage" – the physiologic "cost" of using oxygen. Linked with numerous chronic conditions including diabetes, cardiovascular disease, Alzheimer's, infertility and aging. Free radicals, once formed, damage anything they run into, including proteins, cell membranes, and the cytoskeleton or matrix. [5]

b. Depletion/depression of key anti-oxidant mechanisms when needed most. Anti-oxidants are the first line of defense against oxidative stress, therefore EMF's not only increase oxidative stress, but they suppress natural mechanisms for coping with oxidative damage via:

    i. Suppression of melatonin, an anti-oxidant hormone

    ii. Suppression of Glutathione and SOD (superoxide dismutase) – key free radical scavengers.[6]

c. Mitochondrial damage – RFR damages the energy generating parts of cells.[7]

d. Genotoxicity – RFR damages our DNA leading to mutations.[8]

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[4] By guidelines, I refer to the current IEEE (Institute of Electrical and Electronics Engineers), FCC and OSHA (federal) standards.

[5] Yakymenko, I., Tsybulin, O., Sidorik, E., Henshel, D., Kyrylenko, O., & Kyrylenko, S. (2016). Oxidative mechanisms of biological activity of low-intensity radiofrequency radiation. *Electromagnetic biology and medicine*, *35*(2), 186-202.

[6] Stopczyk, D., Gnitecki, W., Buczyński, A., Markuszewski, L., & Buczyński, J. (2002). Effect of electromagnetic field produced by mobile phones on the activity of superoxide dismutase (SOD-1) and the level of malonyldialdehyde (MDA)--in vitro study. *Medycyna pracy*, *53*(4), 311-314.

[7] Xu, S., Zhou, Z., Zhang, L., Yu, Z., Zhang, W., Wang, Y., ... & He, M. (2010). Exposure to 1800 MHz radiofrequency radiation induces oxidative damage to mitochondrial DNA in primary cultured neurons. *Brain Research*, *1311*, 189-196.

[8] Phillips, J. L., Singh, N. P., & Lai, H. (2009). Electromagnetic fields and DNA damage. *Pathophysiology*, *16*(2-3), 79-88.

e. Cell membrane damage – leading to leakage and wreaking diffuse havoc on normal physiology.[9]

f. Cellular stress – human cells respond to RFR in the same way as they do to any other poison, by generating a stress response which includes production of heat shock proteins.[10]

g. Blood brain barrier leakage – RFR damages the protective lining that keeps harmful substances out of the brain, resulting in brain cell damage and/or death.[11]

18. Over fifty years of clinical evidence further reinforces the basic science conclusion that RFR is a multifactorial toxin. The clearest evidence to support this claim is the Bioinitiative Report. Initially published in 2007, and updated in 2012, this 1,557-page document is a comprehensive review of EMF peer reviewed literature, prepared by 29 independent experts (with no ties to the telecommunications industry) from ten countries. Sadly, the clear conclusions delivered via this massive review were ignored and continue to be ignored. Our current health care predicament, both economic and physical, shares obvious links with RFR exposure. In other words, the very epidemics we grapple with today including but not limited to diabetes and depression/suicide have obvious links to RFR exposure. Links that could have been acted on over a decade ago.

a. The 2012 Bioinitiative Report calls for biologically based exposure guidelines that reflect scientific knowledge. [12] The report concludes: *the continued rollout of wireless technologies and devices puts global public health at risk from*

[9] Phelan, A. M., Lange, D. G., Kues, H. A., & Lutty, G. A. (1992). Modification of membrane fluidity in melanin-containing cells by low-level microwave radiation. *Bioelectromagnetics*, *13*(2), 131-146.
[10] Blank, M., & Goodman, R. (2009). Electromagnetic fields stress living cells. *Pathophysiology*, *16*(2-3), 71-78.
[11] Nittby, H., Brun, A., Eberhardt, J., Malmgren, L., Persson, B. R., & Salford, L. G. (2009). Increased blood–brain barrier permeability in mammalian brain 7 days after exposure to the radiation from a GSM-900 mobile phone. *Pathophysiology*, *16*(2-3), 103-112.
[12] BioInitiative Working Group (2012). Sage C, Carpenter DO, editors. *BioInitiative Report: A Rationale for a Biologically-based Public Exposure Standard for Electromagnetic Radiation* at www. bioinitiative. org

unrestricted wireless commerce unless new, and far lower exposure limits and strong precautionary warnings for their use are implemented. We have the knowledge and means to save global populations from multi-generational adverse health consequences by reducing both ELF (extremely low frequency EMF) and RFR exposures. Proactive and immediate measures to reduce unnecessary EMF exposures will lower disease burden and rates of premature death. The RF Color Charts section of this report outlines the effects from exposures *within* the allowable limits, demonstrating that current guidelines are not health protective.

b. Clear evidence of cancer – Numerous experts concluded that based on current evidence, including the $30 million National Toxicology Program conclusions, RFR should be reclassified as a class I carcinogen. A 2018 review declared: *there is clear evidence that RF radiation is a human carcinogen, causing glioma and vestibular schwannoma (acoustic neuroma). There is some evidence of an increased risk of developing thyroid cancer, and clear evidence that RF radiation is a multi-site carcinogen. Based on the Preamble to the IARC Monographs, RF radiation should be classified as carcinogenic to humans, Group I.*[13] [14]

c. The association of diabetes with RFR exposure has been known for decades and is documented in the 1971 US Naval Medical Research Institute topic review.[15] Various researchers have shown that short term Wi-Fi exposure is a simple and

[13] Hardell, L., & Carlberg, M. (2019). Comments on the US National Toxicology Program technical reports on toxicology and carcinogenesis study in rats exposed to whole-body radiofrequency radiation at 900 MHz and in mice exposed to whole-body radiofrequency radiation at 1,900 MHz. *International journal of oncology*, *54*(1), 111-127.

[14] Miller, A. B., Morgan, L. L., Udasin, I., & Davis, D. L. (2018). Cancer epidemiology update, following the 2011 IARC evaluation of radiofrequency electromagnetic fields (Monograph 102). *Environmental research*, *167*, 673-683.

[15] Glaser, Z. R. (1971). Bibliography of reported biological phenomena ('effects') and clinical manifestations attributed to microwave and radiofrequency radiation. Naval Medical Research Institute Research Report Project MF12. 524.015-0004B. *Res. Inst., Nat. Naval Med. Center, Bcthesda, Md*.

effective means of creating a diabetic animal model in rats.[16] [17] The health and economic consequences of planned 5G infrastructure must be considered in the context of our current diabetes epidemic. Research suggests that the closer you live to a cell tower, the higher your blood glucose.[18] As per the American Diabetes Association, diagnosed diabetes costs America $327 billion dollars annually (1 of every 7 health care dollars spent). Each day, there are 295 diabetes associated amputations, and 137 people started on dialysis for kidney failure. Neither the U.S., nor the state of New Mexico can afford the consequences of a technology expected to increase the prevalence of diabetes.

d. Sperm damage and reproductive harm.[19]

e. Deterioration of mental health, including our current nationwide epidemic of suicide. The science documents increased rates of depression, anxiety, anger, aggression, difficulty with impulse control and mood lability among individuals exposed to radiofrequency radiation.[20,21,22]

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[16] Salah MB, Abdelmelek H, Abderraba M, "Effects of olive leave extract on metabolic disorders and oxidative stress induced by 2.45 GHz WIFI signals," *Environmental Toxicology and Pharmacology* 36(3): 826-834 (2013).
[17] Masoumi, A., Karbalaei, N., Mortazavi, S. M. J., & Shabani, M. (2018). Radiofrequency radiation emitted from Wi-Fi (2.4 GHz) causes impaired insulin secretion and increased oxidative stress in rat pancreatic islets. *International journal of radiation biology*, *94*(9), 850-857.
[18] Meo SA, Alsubaie Y et al., "Association of Exposure to Radio-Frequency Electromagnetic field Radiation (RF-EMFR) Generated by Mobile Phone Base Stations with Glycated Hemoglobin (HbA1c) and Risk of Type 2 Diabetes Mellitus," *Int. J. Environ. Res. Public Health* 12: 14519-14528 (2015).
[19] Desai, N. R., Kesari, K. K., & Agarwal, A. (2009). Pathophysiology of cell phone radiation: oxidative stress and carcinogenesis with focus on male reproductive system. *Reproductive Biology and Endocrinology*, *7*(1), 114.
[20] Pall ML, "Microwave frequency electromagnetic fields (EMFs) produce widespread neuropsychiatric effects including depression," *Journal of Chemical Neuroanatomy* 75: 43-51 (2016).
[21] Levitt BB, Lai H, "Biological effects from exposure to electromagnetic radiation emitted by cell tower base stations and other antenna arrays. *Environmental Reviews* 18(NA): 369-395 (2010).
[22] Lai H, "Neurological Effects of Radiofrequency Electromagnetic Radiation," in Lin JC (ed.), *Advances in Electromagnetic Fields in Living Systems*, Vol. 1, pp. 17-88, NY: Plenum (1994).

f. Antibiotic resistance has been documented in many studies of wireless radiation exposed bacteria.[23] This is important because of the cost of treating drug resistant infections in the U.S., estimated at $20 billion per year excess direct healthcare costs in 2008, and the danger of losing antibiotic efficacy.

19. Based on currently available scientific literature, the claims made that there is "no evidence to prove 5G/millimeter wave technology is harmful" are false. This scientific literature is easily available to anyone interested in doing a PubMed search. 5G or millimeter wave (MMW) technology is proven to be biologically active. [24] [25]Key adverse outcomes already documented in the peer reviewed literature include:

a. Cataracts and other forms of eye damage

b. Immune system damage[26]

c. Antibiotic resistance

d. Nervous system effects, including altered neurotransmitter release - including endogenous opioids - unclear how this could affect opioid epidemic.[27] [28]

Understanding the false claim of "scientific controversy"

20. Evidence-Based Medicine (EBM) is a systematic approach to determining the quality, validity and applicability of a scientific publication. Simply put, EBM is a means of

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[23] Taheri M, Mortazavi SMJ et al, "Evaluation of the Effect of Radiofrequency Radiation Emitted From Wi-Fi Router and Mobile Phone Simulator on the Antibacterial Susceptibility of Pathogenic Bacteria Listeria monocytogenes and Escherichia coli," *Dose-Response* 15(1), **1559325816688527** (2017).
[24] Russell, C. L. (2018). 5 G wireless telecommunications expansion: Public health and environmental implications. *Environmental research*.
[25] Gandhi, O. P., & Riazi, A. (1986). Absorption of millimeter waves by human beings and its biological implications. *IEEE Transactions on Microwave Theory and Techniques*, *34*(2), 228-235.
[26] Kolomytseva, M. P., Gapeev, A. B., Sadovnikov, V. B., & Chemeris, N. K. (2002). Suppression of nonspecific resistance of the body under the effect of extremely high frequency electromagnetic radiation of low intensity. *Biofizika*, *47*(1), 71-77.
[27] Usichenko, T. I., Edinger, H., Gizhko, V. V., Lehmann, C., Wendt, M., & Feyerherd, F. (2006). Low-intensity electromagnetic millimeter waves for pain therapy. *Evidence-based complementary and alternative medicine*, *3*(2), 201-207.
[28] Ziskin, M. C. (2013). Millimeter waves: acoustic and electromagnetic. *Bioelectromagnetics*, *34*(1), 3-14.

differentiating good studies from bad and/or biased ones and is the gold standard used by clinicians and scientists to determine safe and effective practice. Use of EBM principles is crucial when looking to the scientific literature to answer a clinical question, as conclusions from flawed studies can be dangerous in both patient care and public health.

21. The following principles are fundamental to EBM:

    a. Funding of studies, as well as authors, is linked to outcome bias in favor of the funder, therefore results of industry funded studies need to be considered with caution.

    b. Not all studies have equal value – The results of a negative study, showing no harm do not "cancel out" those of a positive one that does demonstrate harm.

    c. Certain issues specific to wireless technology, must be considered and understood in order to evaluate the validity of a scientific article.

        i. No unexposed control group – Because RFR exposure is ubiquitous in our environment, even if someone does not own a cell phone, they will have RFR exposure from other sources (Wi-Fi, friend's/neighbor's cell phones, cell towers, etc.). Therefore, any effect detected in an observational study will seem weaker than it truly is. In other words, it is much harder to see the "harm" when studying an RF emitting device like a cell phone.

        ii. Study protocols do not simulate real world exposures – For instance, a study of the effects of exposure to the radiation equivalent of one cell phone. Realistically, very few people are exposed to only one phone. A more relevant study would examine the effect of multiple phones, wireless networks, cell towers, and other emitting devices, all operating at the same

time. The fact that we still see harmful effects with very low intensity radiation exposure studies, tells us that these fields are very dangerous and that the research underestimates the true effect.

22. When the principles of evidence-based medicine are applied by independent EMF scientists, such as was done in the Bioinitiative Report, there can be no other conclusion than seeing the obvious harm from EMF's.

5G is illegal experimentation on human subjects

23. 5G technology is experimental. It will expose American citizens to a biologically active form of wireless radiation, that has not been premarket safety tested. The proposed 5G rollout will lead to 24/7 mandatory irradiation of the entire population, without informed consent or the possibility of opting out. This means mandatory irradiation of pregnant women, children, the elderly and other sensitive populations. The proposed 5G rollout is, therefore, an obvious violation of national and international laws that prohibit research on human subjects without their informed consent.

Who will pay the additional healthcare costs associated with 5G?

24. Based on the peer reviewed literature, additional irradiation of the U.S. population will lead to added disease burden. Why should New Mexicans be subjected to any of the known and health sequalae of the RFR bioeffects outlined in this document? Who will shoulder the predictable and preventable cost of increased healthcare spending due to excess cataracts, drug resistant infections, diabetes treatment and complications, and derangements of the immune and nervous systems?[29]

[29] End stage renal disease (ESRD), one of many potential complications of diabetes, automatically qualifies an eligible person for Medicare – regardless of age. ESRD is increasing by 5% per year. ESRD associated costs consume 7% of the Medicare budget due to the high cost of hemodialysis ($89,000 per patient, per year). https://pharm.ucsf.edu/kidney/need/statistics

Conclusion

I assert, beyond a reasonable degree of scientific certainty, that continued expansion of wireless infrastructure will have clear and predictable health and economic consequences for New Mexicans. Wireless radiation is a scientifically proven environmental toxin. Any claim stating otherwise, or assertion of the safety of wireless radiation is false and should be disregarded. There is absolutely no justification for wireless antennae to be placed on our sidewalks and light poles, leading to mandatory irradiation of all citizens. I urge you to act now, as the proposed 5G rollout is a clear violation of the U.S. Constitution, as well as the laws prohibiting research on human subjects without their informed consent.

I declare under penalty of perjury that the foregoing is true and correct.

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Sharon Goldberg, MD
Signed: 3/28/2019
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