SCHEDULE 1

EVIDENCE OF BIOLOGICAL EFFECTS AT VARIOUS FREQUENCIES

Taken from the BioInitiative Report 2012 (updated to 2019), pgs 94 – 104

https://bioinitiative.org/

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure
(Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

Power Density (Microwatts/centimeter2 - uW/cm2)		Reference
As low as (10^{-13}) or 100 femtowatts/cm2	Super-low intensity RFR effects at MW reasonant frequencies resulted in changes in genes; problems with chromatin conformation (DNA)	Belyaev, 1997
5 picowatts/cm2 (10^{-12})	Changed growth rates in yeast cells	Grundler, 1992
0.1 nanowatt/cm2 (10^{-10}) or 100 picowatts/cm2	Super-low intensity RFR effects at MW reasonant frequencies resulted in changes in genes; problems with chromatin condensation (DNA) intensities comparable to base stations	Belyaev, 1997
0.00034 uW/cm2	Chronic exposure to mobile phone pulsed RF significantly reduced sperm count,	Behari, 2006
0.0005 uW/cm2	RFR decreased cell proliferation at 960 MHz GSM 217 Hz for 30-min exposure	Velizarov, 1999
0.0006 - 0.0128 uW/cm2	Fatigue, depressive tendency, sleeping disorders, concentration difficulties, cardio- vascular problems reported with exposure to GSM 900/1800 MHz cell phone signal at base station level exposures.	Oberfeld, 2004
0.003 - 0.02 uW/cm2	In children and adolescents (8-17 yrs) short-term exposure caused headache, irritation, concentration difficulties in school.	Heinrich, 2010
0.003 to 0.05 uW/cm2	In children and adolescents (8-17 yrs) short-term exposure caused conduct problems in school (behavioral problems)	Thomas, 2010
0.005 uW/cm2	In adults (30-60 yrs) chronic exposure caused sleep disturbances, (but not significantly increased across the entire population)	Mohler, 2010
0.005 - 0.04 uW/cm2	Adults exposed to short-term cell phone radiation reported headaches, concentration difficulties (differences not significant, but elevated)	Thomas, 2008
0.006 - 0.01 uW/cm2	Chronic exposure to base station RF (whole-body) in humans showed increased stress hormones; dopamine levels substantially decreased; higher levels of adrenaline and nor-adrenaline; dose-response seen; produced chronic physiological stress in cells even after 1.5 years.	Buchner, 2012
0.01 - 0.11 uW/cm2	RFR from cell towers caused fatigue, headaches, sleeping problems	Navarro, 2003

Stress proteins, HSP, disrupted immune function	Brain tumors and blood-brain barrier
Reproduction/fertility effects	Sleep, neuron firing rate, EEG, memory, learning, behavior
Oxidative damage/ROS/DNA damage/DNA repair failure	Cancer (other than brain), cell proliferation
Disrupted calcium metabolism	Cardiac, heart muscle, blood-pressure, vascular effects

Reported Biological Effects from Radiofrequency Radiation at Low-Intensity Exposure
(Cell Tower, Wi-Fi, Wireless Laptop and 'Smart' Meter RF Intensities)

SAR (Watts/Kilogram)		Reference
1.0 W/Kg	Motility, sperm count, sperm morphology, and viability reduced in active cell phone users (human males) in dose-dependent manner.	Agarwal, 2008
1.0 W/Kg	GSM cell phone use modulates brain wave oscillations and sleep EEG	Huber, 2002
1.0 W/Kg	Cell phone RFR during waking hours affects brain wave activity. (EEG patterns) during subsequent sleep	Achermann, 2000
1.0 W/Kg	Cell phone use causes nitric oxide (NO) nasal vasodilation (swelling inside nasal passage) on side of head phone use	Paredi, 2001
1.0 W/Kg	Increase in headache, fatigue and heating behind ear in cell phone users	Sandstrom, 2001
1.0 W/Kg	Significant increase in concentration difficulties using 1800 MHz cell phone compared to 900 MHz cell phone	Santini, 2001
1.0 W/Kg	Sleep patterns and brain wave activity are changed with 900 MHz cell phone radiation exposure during sleep	Borbely, 1999
1.4 W/Kg	GSM cell phone exposure induced heat shock protein HSP 70 by 360% (stress response) and phosphorylation of ELK-1 by 390%	Weisbrot, 2003
1.46 W/Kg	850 MHz cell phone radiation decreases sperm motility, viability is significantly decreased; increased oxidative damage (free-radicals) significantly decreased; increased oxidative damage (free-radicals)	Agarwal, 2009
1.48 W/Kg	A significant decrease in protein kinase C activity at 112 MHz with 2-hr per day for 35 days; hippocampus is site, consistent with reports that RFR negatively affects learning and memory functions	Paulraj, 2004
1.0 - 2.0 W/Kg	Significant elevation in micronuclei in peripheral blood cells at 2450 MHz (8 treatments of 2-hr each)	Trosic, 2002
1.5 W/Kg	GSM cell phone exposure affected gene expression levels in tumor suppressor p53-deficient embryonic stem cells; and significantly increased HSP 70 heat shock protein production	Czyz, 2004
1.8 W/Kg	Whole-body exposure to RF cell phone radiation of 900-1800 MHz 1 cm from head of rats caused high incidence of sperm cell death; deformation of sperm cells; prominent clumping together of sperm cells into "grass bundle shapes" that are unable to separate/swim. Sperm cells unable to swim and fertilize in normal manner.	Yan, 2007

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SAR (Watts/Kilogram)		Reference
2.0 W/Kg	GSM cell phone exposure of 1-hr activated heat shock protein HSP 27 (stress response) and P38 MAPK (mutagen-activated protein kinase) that authors say facilitates brain cancer and increased blood-brain barrier permeability, allowing toxins to cross BBB into brain	Leszczynski, 2002
2 W/Kg	900 MHz cell phone exposure caused brain cell oxidative damage by increasing levels of NO, MDA, XO and ADA in brain cells; caused statistically significant increase in 'dark neurons' or damaged brain cells in cortex, hippocampus and basal ganglia with a 1-hr exposure for 7 consecutive days	Ilhan, 2004
2.6 W/Kg	900 MHz cell phone exposure for 1-hr significantly altered protein expression levels in 38 proteins following irradiation; activates P38 MAP kinase stress signalling pathway and leads to changes in cell sie and shape (shrinking and rounding up) and to activation of HSP 27, a stress protein (heat shock protein)	Leszczynski, 2004
2.0 - 3.0 W/Kg	RFR accelerated development of both skin and breast tumors	Szmigielski, 1982
2 W/Kg	Pulse-modulated RFR and MF affect brain physiology (sleep study)	Schmidt, 2012

STANDARDS		
0.08 W/Kg	IEEE Standard uncontrolled public environment (whole body)	IEEE
0.4 W/Kg	IEEE Standard controlled occupational environment (whole body)	IEEE
1.6 W/Kg	FCC (IEEE) SAR limit for 1 gram of tissue in a partial body exposure	FCC, 1996
2 W/Kg	ICNIRP SAR limit for 10 grams of tissue	ICNIRP, 1996

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8.75 uW/cm2	RFR at 900 MHz for 2-12 hours caused DNA breaks in leukemia cells	Marinelli, 2004
10 uW/cm2	Changes in behavior (avoidance) after 0.5 hour exposure to pulsed RFR	Navakatikian, 1994
10 - 100 uW/cm2	Increased risk in radar operators of cancer; very short latency period; dose response to exposure level of RFR reported.	Richter, 2000
12.5 uW/cm2	RFR caused calcium efflux in cells - can affect many critical cell functions	Dutta, 1989
13.5 uW/cm2	RFR affected human lymphocytes - induced stress response in cells	Sarimov, 2004
20 uW/cm2	Increase in serum cortisol (a stress hormone)	Mann, 1998
28.2 uW/cm2	RFR increased free radical production in rat cells	Yurekli, 2006
37.5 uW/cm2	Immune system effects - elevation of PFC count (antibody producing cells	Veyret, 1991
45 uW/cm2	Pulsed RFR affected serum testosterone levels in mice	Forgacs, 2006
50 uW/cm2	Cell phone RFR caused a pathological leakage of the blood-brain barrier in 1 hour	Salford, 2003
50 uW/cm2	An 18% reduction in REM sleep (important to memory and learning functions)	Mann, 1996
60 uW/cm2	RFR caused structural changes in cells of mouse embryos	Somozy, 1991
60 uW/cm2	Pulsed RFR affected immune function in white blood cells	Stankiewicz, 2006
60 uW/cm2	Cortex of the brain was activated by 15 minutes of 902 MHz cell phone	Lebedeva, 2000
65 uW/cm2	RFR affected genes related to cancer	Ivaschuk, 1999
92.5 uW/cm2	RFR caused genetic changes in human white blood cells	Belyaev, 2005
100 uW/cm2	Changes in immune function	Elekes, 1996
100 uW/cm2	A 24.3% drop in testosterone after 6 hours of CW RFR exposure	Navakatikian, 1994
120 uW/cm2	A pathological leakage in the blood-brain barrier with 915 MHz cell RF	Salford, 1994

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Power Density (Microwatts/centimeter2 - uW/cm2)		Reference
500 uW/cm2	Intestinal epithelial cells exposed to 2.45 GHz pulsed at 16 Hz showed changes in intercellular calcium.	Somozy, 1993
500 uW/cm2	A 24.6% drop in testosterone and 23.2% drop in insulin after 12 hrs of pulsed RFR exposure.	Navakatikian, 1994

STANDARDS		
530 - 600 uW/cm2	Limit for uncontrolled public exposure to 800-900 MHz	ANSI/IEEE and FCC
1000 uW/cm2	PCS STANDARD for public exposure (as of September 1,1997)	FCC, 1996
5000 uW/cm2	PCS STANDARD for occupational exposure (as of September 1, 1997)	FCC, 1996
BACKGROUND LEVELS		
0.003 uW/cm2	Background RF levels in US cities and suburbs in the 1990s	Mantiply, 1997
0.05 uW/cm2	Median ambient power density in cities in Sweden (30-2000 MHz)	Hamnierius, 2000
0.1 - 10 uW/cm2	Ambient power density within 100-200' of cell site in US (data from 2000)	Sage, 2000

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SAR (Watts/Kilogram)		Reference
0.000064 - 0.000078 W/Kg	Well-being and cognitive function affected in humans exposed to GSM-UMTS cell phone frequencies; RF levels similar near cell sites	TNO Physics and
0.00015 - 0.003 W/Kg	Calcium ion movement in isolated frog heart tissue is increased 18% (P<.01) and by 21% (P<.05) by weak RF field modulated at 16 Hz	Schwartz, 1990
0.000021 - 0.0021 W/Kg	Changes in cell cycle; cell proliferation (960 MHz GSM mobile phone)	Kwee, 1997
0.0003 - 0.06 W/Kg	Neurobehavioral disorders in offspring of pregnant mice exposed in utero to cell phones - dose-response impaired glutamatergic synaptic transmission onto layer V pyramidal neurons of the prefrontal cortex. Hyperactivity and impaired memory function in offspring. Altered brain development.	Aldad, 2012
0.0016 - 0.0044 W/Kg	Very low power 700 MHz CW affects excitability of hippocampus tissue, consistent with reported behavioral changes.	Tattersall, 2001
0.0021 W/Kg	Heat shock protein HSP 70 is activated by very low intensity microwave exposure in human epithelial amnion cells	Kwee, 2001
0.0024 - 0.024 W/Kg	Digital cell phone RFR at very low intensities causes DNA damage in human cells; both DNA damage and impairment of DNA is reported	Phillips, 1998
0.0027 W/Kg	Changes in active avoidance conditioned behavioral effect is seen after one-half hour of pulsed radiofrequency radiation	Navakatikian, 1994
0.0035 W/Kg	900 MHz cell phone signal induces DNA breaks and early activation of p53 gene; short exposure of 2-12 hours leads cells to acquire greater survival chance - linked to tumor agressiveness.	Marinelli, 2004
0.0095 W/Kg	MW modulated at 7 Hz produces more errors in short-term memory functioin on complex tasks (can affect cognitive processes such as attention and memory)	Lass, 2002
0.001 W/Kg	750 MHz continuous wave (CW) RFR exposure caused increase in heat shock protein (stress proteins). Equivalent to what would be induced by 3 degree C. heating of tissue (but no heating occurred)	De Pomerai, 2000
0.001 W/Kg	Statistically significant change in intracellular calcium concentration in heart muscle cells exposed to RFR (900 MHz/50 Hz modulation)	Wolke, 1996

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0.0021 W/Kg	A significant change in cell proliferation not attributable to thermal heating. RFR induces non-thermal stress proteins (960 MHz GSM)	Velizarov, 1999
0.004 - 0.008 W/Kg	915 MHz cell phone RFR caused pathological leakage of blood-brain barrier. Worst at lower SAR levels and worse with CW compared to Frequency of pathological changes was 35% in rats exposed to pulsed radiation at 50% to continuous wave RFR. Effects observed at a specific absorption (SA) of > 1.5 joules/Kg in human tissues	Persson, 1997
0.0059 W/Kg	Cell phone RFR induces glioma (brain cancer) cells to significantly increase thymidine uptake, which may be indication of more cell division	Stagg, 1997
0.014 W/Kg	Sperm damage from oxidative stress and lowered melatonin levels resulted from 2-hr per day/45 days exposure to 10 GHz.	Kumar, 2012
0.015 W/Kg	Immune system effects - elevation of PFC count (antibody-producing cells)	Veyret, 1991
0.02 W/Kg	A single, 2-hr exposure to GSM cell phone radiation results in serious neuron damage (brain cell damage) and death in cortex, hippocampus, and basal ganglia of brain- even 50+ days later blood-brain barrier is still leaking albumin (P<.002) following only one cell phone exposure	Salford, 2003
0.026 W/Kg	Activity of c-jun (oncogene or cancer gene) was altered in cells after 20 minutes exposure to cell phone digital TDMA signal	Ivaschuk, 1997
0.0317 W/Kg	Decrease in eating and drinking behavior	Ray, 1990
0.037 W/Kg	Hyperactivity caused by nitric oxide synthase inhibitor is countered by exposure to ultra-wide band pulses (600/sec) for 30 min	Seaman, 1999
0.037 - 0.040 W/Kg	A 1-hr cell phone exposure causes chromatin condensation; impaired DNA repair mechanisms; last 3 days (longer than stress response) the effect reaches saturation in only one hour of exposure; electro- sensitive (ES) people have different response in formation of DNA repair foci, compared to healthy individuals; effects depend on carrier frequency (915 MHz = 0.037 W/Kg but 1947 MHz = 0.040 W/Kg)	Belyaev, 2008
0.05 W/Kg	Significant increase in firing rate of neurons (350%) with pulsed 900 MHz cell phone radiation exposure (but not with CW) in avian brain cells	Beason, 2002

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SAR (Watts/Kilogram)		Reference
0.09 W/Kg	900 MHz study of mice for 7 days, 12-hr per day (whole-body) resulted in significant effect on mitochondria and genome stability	Aitken, 2005
0.091 W/Kg	Wireless internet 2400 MHz, 24-hrs per day/20 weeks increased DNA damage and reduced DNA repair; levels below 802.11 g Authors say "findings raise questions about safety of radiofrequency exposure from Wi-Fi internet access devices for growing organisms of reproductive age, with a potential effect on fertility and integrity of germ cells" (male germ cells are the reproductive cells=sperm)	Atasoy, 2012
0.11 W/Kg	Increased cell death (apoptosis) and DNA fragmentation at 2.45 GHz for 35 days exposure (chronic exposure study)	Kesari, 2010
0.121 W/Kg	Cardiovascular system shows significant decrease in arterial blood pressure (hypotension) after exposure to ultra-wide band pulses	Lu, 1999
0.13 - 1.4 W/Kg	Lymphoma cancer rate doubled with two 1/2-hr exposures per day of cell phone radiation for 18 months (pulsed 900 MHz cell signal)	Repacholi, 1997
0.14 W/Kg	Elevation of immune response to RFR exposure	Elekes, 1996
0.141 W/Kg	Structural changes in testes - smaller diameter of seminiferous	Dasdag, 1999
0.15 - 0.4 W/Kg	Statistically significant increase in malignant tumors in rats chronically exposed to RFR	Chou, 1992
0.26 W/Kg	Harmful effects to the eye/certain drugs sensitize the eye to RFR	Kues, 1992
0.28 - 1.33 W/Kg	Significant increase in reported headaches with increasing use of hand-held cell phone use (maximum tested was 60 min per day)	Chia, 2000
0.3 - 0.44 W/Kg	Cell phone use results in changes in cognitive thinking/mental tasks related to memory retrieval	Krause, 2000
0.3 - 0.44 W/Kg	Attention function of brain and brain responses are speeded up	Preece, 1999
0.3 - 0.46 W/Kg	Cell phone RFR doubles pathological leakage of blood-brain barrier permeability at two days (P=.002) and triples permeability at four days (P=.001) at 1800 MHz GSM cell phone radiation	Schirmacher, 2000
0.43 W/Kg	Significant decrease in sperm mobility; drop in sperm concentration; and decrease in seminiferous tubules at 800 MHz, 8-hr/day, 12 weeks, with mobile phone radiation level on STANDBY ONLY (in rabbits)	Salama, 2008

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0.5 W/Kg	900 MHz pulsed RF affects firing rate of neurons (Lymnea stagnalis) but continuous wave had no effect	Bolshakov, 1992
0.58 - 0.75 W/Kg	Decrease in brain tumors after chronic exposure to RFR at 836 MHz	Adey, 1999
0.6 - 0.9 W/Kg	Mouse embryos develop fragile cranial bones from in utero 900 MHz The authors say "(O)ur results clearly show that even modest exposure (e.g., 6 min daily for 21 days" is sufficient to interfere with the normal mouse developmental process"	Fragopoulou, 2009
0.6 and 1.2 W/Kg	Increase in DNA single and double-strand DNA breaks in rat brain cells with exposure to 2450 MHz RFR	Lai & Singh, 1996
0.795 W/Kg	GSM 900 MHz, 217 Hz significantly decreases ovarian development and size of ovaries, due to DNA damage and premature cell death of nurse cells and follicles in ovaries (that nourish egg cells)	Panagopoulous, 2012
0.87 W/Kg	Altered human mental performance after exposure to GSM cell phone radiation (900 MHz TDMA digital cell phone signal)	Hamblin, 2004
0.87 W/Kg	Change in human brainwaves; decrease in EEG potential and statistically significant change in alpha (8-13 Hz) and beta (13-22 Hz) brainwave activity in humans at 900 MHz; exposures 6/min per day for 21 days (chronic exposure)	D'Costa, 2003
0.9 W/Kg	Decreased sperm count and more sperm cell death (apoptosis) after 35 days exposure, 2-hr per day	Kesari, 2012
< 1.0 W/Kg	Rats exposed to mobile phone radiation on STANDBY ONLY for 11-hr 45-min plus 15-min TRANSMIT mode; 2 times per day for 21 days showed decreased number of ovarian follicles in pups born to these pregnant rats. The authors conclude "the decreased number of follicles in pups exposed to mobile phone microwaves suggest that intrauterine exposure has toxic effects on ovaries."	Gul, 2009
0.4 - 1.0 W/Kg	One 6-hr exposure to 1800 MHz cell phone radiation in human sperm cells caused a significant dose response and reduced sperm motility and viability; reactive oxygen species levels were significantly increased after exposure to 1.0 W/Kg; study confirms detrimental effects of RF/MW to human sperm. The authors conclude "(T)hese findings have clear implicatiions for the safety of extensive mobile phone use by males of reproductive age, potentially affecting both their fertility and the health and wellbeing of their offspring."	De Iuliis, 2009
1.0 W/Kg	Human semen degraded by exposure to cell phone frequency RF increased free-radical damage.	De Iuliis, 2009

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SCHEDULE 2

Letter from Dr Andrew Tressider relating to Electrosensitivity

Dr Andrew Tresidder MBBS MRCGP (1989) Cert Med Ed, Section 12 Approved Doctor

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Nov 2018

To my Medical Colleagues, GPs, Psychiatrists, Neurologists and others:

Electrosensitivity – an Environmental illness, an Authentic Diagnosis, not a Delusional Disorder

Summary:

Electrosensitivity is the symptomatic sensitivity to Electric or Magnetic Fields of any frequency, including RadioFrequency (RF or Microwave) transmissions. As a symptomatic condition, it is becoming common due to the increasing environmental pressure on human biology. The source is pollution from wireless and other EM fields. Doctors as yet rarely recognize it due to educational issues. Safety always lags technological advance. There are barriers to recognition of harms. Current UK Advisory Safety Limits are based upon the outdated and disproven myth that Non-Thermal means Non-Harmful. Society and organizations have yet to fully travel the road from 'there isn't a problem', 'there might be a problem but it's very small' to 'there is a problem'. Society does not recognize humans as electromagnetic beings, as well as physical bodies needing careful nutrition to maintain health. Meanwhile, increasing numbers of people suffer, often ignored or dismissed because society doesn't yet appreciate the issue, and doctors have no answers. Electrosensitivity is soundly supported by both biology and physics.

You may be being consulted by a person who has this under-recognised condition.Thank you for reading this. It provides information that you may not easily find elsewhere.
Electrosensitivity (ES) is a condition first described in 1932, and is when a person's physiology is affected by external Electromagnetic (EM) fields, giving rise to a typical spectrum of symptoms, often neurological. It is therefore an illness caused by environmental agents – essentially an environmental toxic pollutant. Electrophobia is a fear of EM fields, and is a nocebo driven response. Symptoms of fear or paranoia about any agent, circumstances, person or issues can be part of a psychiatric condition, and may be part of a delusional state which will have other features. ES is completely separate from any delusional condition and from Electrophobia.

ES is a condition that can arise due to continued exposure to an environment polluted by man-made EM and RF (radio-frequency) wireless signals at levels at orders of magnitude below heating effects, and is well understood in Russia. Symptoms include headaches, fatigue, disturbed sleep, tingling, pains in limbs, head or face, stabbing pains, brain-fog and impaired cognitive function, dizziness, tinnitus, nosebleeds, palpitations and others.

Chronic Fatigue Syndrome, (now known to be partially a failure of mitochondrial function) was initially difficult to diagnose and indeed construed by some as psychological illness. I have written this briefing sheet to summarise my understanding of ES in case you wish to consider it in your differential diagnosis.

My qualifications for this are as follows: I trained at Guy's Hospital, and have been a GP since 1989, seeing a wide range of Primary Care Practice. I have a special interest in Health and Well Being, both physical, psychological and emotional, and have studied this whilst working with my patients. I seek to give the best of orthodox diagnoses and treatment, and also recognise other factors that contribute to and may maintain ill health, in order to eliminate them if possible. I have a wide-ranging interest in factors that affect health. I work for NHS Somerset CCG as a GP Patient Safety Lead, where I have done a number of Investigations into Root Causes, for the University of Bristol as an Examiner and Educator and former Somerset Academy GP Lead, and am approved under the Mental Health Act as a Section 12 Doctor. I teach Doctors on Health and Self-Care on behalf of the BMA and in Somerset Hospitals and wider afield.

I am also a trustee of the charity ES-UK, which post has given me access to more information and research about the condition than many clinical colleagues, and in this I have consulted scores of people (at no charge) with electrosensitivity, severe enough to impact badly upon their lives. **My Experience:** As a Section 12 Approved Doctor under the Mental Health Act, I have been involved in at least 400 Mental Health Act Assessments over ten years, and have good relationships with our excellent Somerset Psychiatrists. In all of the assessments I have done, though I have seen many patients with paranoia or delusional states including reference and being watched from the television and the like, I have never seen anyone with ES during an MHAA.

I have however, separately (i.e. not in Mental Health Act Assessment settings) seen patients whose symptoms are reliably caused by exposure to Electromagnetic fields, especially RF (Radiofrequency) transmitting echnology, but also by EM Fields and by Dirty Electricity (for an explanation see below). It is only too easy, as I know from my medical career, to make a diagnosis only from the choices within the medical framework that we have learnt about, often years ago, especially when faced with a condition whose aetiology we cannot explain.

System Educational Problem: The aetiology of ES is discussed below but essentially the big problem that we all face as Clinicians, Scientists and Researchers is that the Medicine we have learnt is predominantly based on the discipline of Chemistry – not Physics. Yes, MRI Scanners and CT scans are Physics (i.e, information technology) based – however the vast majority of the narrative of pathology, physiology, anatomy, diagnostics and therapeutics is Chemistry based. Yet we are seeing in the field of IT that a Physics based understanding of technology has changed our world (yes, your phone, computer, internet use etc. has Chemistry based hardware, but the working of it is largely Physics based). And all clinicians are aware, from the history of medicine, that new insights into understanding are always occurring.

Actually, there is a growing awareness that the human body works on biophotons and information flows https://www.ncbi.nlm.nih.gov/pubmed/15947465 and electromagnetics as

well as Chemistry, and that proteins in cell walls work as switching transistors. No wonder that exposure to certain frequencies of EM or RF fields at low power can have a biological effect – because this is how the cells work on microvoltage and microwattage powers (see *Energy Medicine*, James Oschman, 2nd ed. 2015, Elsevier).

And of course the first noticed symptomatic effects will be on the nervous system, especially if already compromised due to (common) sub-clinical nutritional deficiencies of Omega 3 fatty acids, B Vitamins (think pellagra as a deficiency illness), intra-cellular magnesium, zinc, manganese and others.

Potential Diagnostic Traps: If we as doctors cannot explain something, it's only too easy to diagnose the problem as either psychological or delusional, and in this we may fall into error, caused by our own unfamiliarity or the progress of understanding faster than our educational system transmits to us. If one has never yet diagnosed a case, it can need an astute diagnostician to differentiate between the unfamiliar yet real effects happening in a body at unseen levels resulting in distressing symptoms which give avoidance behaviour (because that person knows that they feel unwell near certain devices), and on the other hand a patient with a true delusional state as part of a mental disorder. However, once the clinician is aware of the existence of Electrosensitivity, the differentiation becomes easy, especially after seeing the pattern of several cases, as delusional states usually have several characteristic facets to them, and do not claim a plausible (though as yet unfamiliar) Physics based explanation.

An **unfortunate myth/mantra** perpetuated in science, by Private Industry Bodies such as ICNIRP, with its own vested interests, and repeated by Regulatory Bodies including PHE (HPA), (some of whose advisers are members of ICNIRP, which is surprising, and could be construed as a conflict of interest) is that **nonthermal = non-harmful (now known to be FALSE)** (i.e. if it doesn't heat you over 6 minutes) – but this completely ignores all signal effects, which have known biological consequences. If ants can die from proximity to a wifi router, mobile phone or laptop on wifi (because they lose their ability to navigate, as caused by a signal, not a thermal effect) https://www.ncbi.nlm.nih.gov/pubmed/23977878), rats' retinas be harmed by certain frequencies of LED light
https://www.ncbi.nlm.nih.gov/pubmed/25863264
whilst our ears can detect a billionth of a watt and our eyes a single photon, then is it surprising that measurable EM or RF fields can affect some people – and some people become hypersensitive and develop nervous system symptoms to extremely weak signals?

Safety issues always lag technological advance, whether from new medicines, car safety (think seat belts and tyre tread), asbestos etc, and early advice about possible problems is often ignored by not believing, by discrediting or worse by blaming the messenger. (It is human nature to be conservative).

From research, I have learnt about the **importance of sleep, posture, breathing, emotional support, nutritional correctness, and freedom from electromagnetic transmission fields** amongst other areas.

I have seen a number of people who feel unwell in the vicinity of wireless transmitters, mobile phone masts, cordless phones, from using a mobile phone, and from active alarm sensors, amongst other things, in my practice as a GP and elsewhere. I can confirm this from

experience of headaches, brain fog and word finding difficulties with prolonged exposure to RF including wifi, mobile or cordless phones.

A **typical history** of a more severe case is that after an electromagnetic insult (such as a new powerful RF (wireless) device being introduced into the person's environment, or an electric shock), symptoms may progressively appear, in response to exposure to electromagnetic fields of various different types. These fields include using appliances such as hair-driers, vacuums or cookers, which produce high levels of electric and magnetic fields, or cordless phones, wifi routers, mobile phones and a whole range of wireless transmitting technology which produces RF (radiofrequency, or microwave) transmissions, or computers, monitors and other devices, and fluorescent lights (as opposed to the older incandescent type of bulbs). **A careful history** is paramount in detecting this condition, especially if aggravating and alleviating factors are described and detected, possibly helped by using field detectors (measuring devices for EM fields and wireless radiation).

Symptoms include headaches, fatigue, disturbed sleep, tingling, pains in limbs, head or face, stabbing pains, brain-fog and impaired cognitive function, dizziness, tinnitus, nosebleeds, palpitations and others.

It is clear that the primary area of disturbance is in the nervous system. It is not known why some people react to these and others do not, however it may be that **heterogeneity of genetic make-up, nutritional status, and other factors** predispose people to develop the condition once sensitised. Certainly general factors like lack of sleep can exacerbate the issue.

Mechanisms include voltage-gated calcium channel disruption, upregulation of the sympathetic nervous system, interference in the blood brain barrier and alteration of melatonin production, production of heat shock proteins, failure of DNA recombination due to the radical spin pair mechanism, and interference with intercellular microsignalling and circadian rhythms. What is certain is that it is not a nocebo effect, as animals are affected, such as ants, fruit flies and others. As we understand more about biological systems using electromagnetic signals to communicate, a whole host of biological effects will become apparent. We already know that semen quality is affected by RF https://www.ncbi.nlm.nih.gov/pubmed/24927498 .

Prevalence: some people suffer from Electrosensitivity to a severe and incapacitating degree, which affects less than 1% of the population, whilst moderate may affect up to 3-5%, and mild 20-30%. Please see: The Austrian Medical Association EMF Guidelines, and "Electrosensitivity: Sources, Symptoms and Solutions" *Textbook of Bioelectromagnetic and Subtle Energy Medicine*, 2nd ed., 2015. http://www.esuk.info/wp-content/uploads/2018/11/02.2-Tresidder-and-Bevington-ES-chapter-47-2015.pdf

Electrosensitivity is an under-recognised illness in the Western world. However, since the 1930s it has been recognised by Russia and the former Eastern Bloc countries, and also by the US in Naval Medical research https://www.magdahavas.com/wp-content/uploads/2010/08/Barrie_Trower_SA.pdf It did not exist before mains current was used. Now that many people are being exposed to radio frequency transmissions, both in and outside the home and workplace, the number of people who fall ill because of this will rise. Current sufferers, if able to obtain a correct diagnosis, are likely to be seen in retrospect as the

canaries, the early messengers of problems. ES appears to be a disability caused by environmental pollution, and may be a useful warning sign for society of a problem. For an interesting view on this, with research based upon many years of government activity from the 1950s on, see Wifi, a potential Thalidomide
http://ec.europa.eu/health/scientific_committees/emerging/docs/emf_117.pdf

The whole area may be an inconvenient truth, and sometimes it is easier to discredit the messenger than to honestly investigate forwards. It is **not yet taught about at medical school or to PostGrads** and therefore is unlikely to be diagnosed by most GPs or Hospital Specialists at present. In two or three years' time, the picture is likely to be different regarding medical knowledge and expertise. This is a new area of disability that is explicitly recognised in Canada, Sweden and the USA, and is becoming more and more important.

Treatment is currently problematical. It is essential to **minimise exposure** to adverse EM fields, as well as **pay attention to nutrition, sleep and other factors to ensure high levels of health**. Despite this, many people steadily worsen, and become casualties of the environmental RF and EM pollution, causing a steady decline in their health, often losing their jobs, ability to enter public places, and sometimes even unable to remain in their houses. Current UK NHS medical knowledge and approaches offer little hope of any treatment or improvement, although a number of GPs and others do recognise the condition. Future hope may be found by taking a salutogenic (health oriented) approach.

Current and historical UK PHE (HPA) advice is based on the **outdated incorrect theory** that only thermal effects may cause harm, and takes no recognition of signal effects, and therefore is unhelpful. The PHE advice is based upon the flawed Advisory Group on Non-Ionising Radiation (AGNIR) 2012 Report, which has **'an incorrect and misleading executive summary and overall conclusions, inaccurate statements, omissions and conflict of interest'** (see Appendix). Unfortunately, senior people in UK Scientific and Advisory bodies still trust this outdated theory, partly due to the System Educational Problems. A few authorities still consider that the condition is a psychologically mediated nocebo effect ('we don't know what's going on, so the patient must wrong') – such authorities come from the same school of thought that decided that CFS/ME was psychologically mediated. We now understand the biological basis of compromised mitochondrial function. This historical view of CFS can be replaced now we understand how mitochondrial function is implicated.
http://www.ijcem.com/files/IJCEM812001.pdf .

A thorough review of up-to-date papers on Electrosensitivity appears in Bevington's summary 'Select Studies on ES and EHS' available on the Research tag in the ES-UK websitehttp:
http://www.es-uk.info/wpcontent/uploads/2018/11/02.3-Selected-ES-and-EHS-Studies-2018.pdf

Society is aware that most mobile and smart phones now include advice to keep them away from the body (though 'pocket hotspots' are being popularized); it seems as though the industry may be shifting position towards acknowledging not just heating effects, but also other significant non-thermal effects.

Some areas of the Insurance Industry have serious concerns about the health effects, and exclude cover for EM and RF from their policies. In the USA, unusual multifocal breast

cancers in young women in their 20s have been reported immediately adjacent to where their mobile phone has been kept in the bra.

Since symptoms from EM exposure can be delayed and cumulative, a patient's history of symptoms and exposures may be difficult to follow for someone not experienced in the types of technology now known to have biological effects.

Thank you for considering this diagnosis in your differential of possibilities. I hope this is of assistance to you.

Yours sincerely,

Andrew Tresidder

Useful resources:

Valuable technical studies on objective physical markers and symptoms include:

- The Austrian Medical Association Guidelines: http://electromagnetichealth.org/wpcontent/uploads/2012/04/EMF-Guideline.pdf

- Belpomme et al, 2015: *Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder*. https://www.ncbi.nlm.nih.gov/pubmed/26613326

- Belyaev et al, 2016: *EUROPAEM 2016 EMF Guideline 2016 for the Prevention, Diagnosis and Treatment of EMF-related Health Problems and Illnesses* https://www.ncbi.nlm.nih.gov/labs/articles/27454111/

- Work (trans.) by the German psychiatrist and psychotherapist C Aschermann: http://emfsafetynetwork.org/wp-content/uploads/2009/10/Aschermann2009.pdf

- Andrew Tresidder & Michael Bevington: “Electrosensitivity: Sources, Symptoms and Solutions” ch. 47 in: *Textbook of Bioelectromagnetic and Subtle Energy Medicine*, 2nd ed., Paul Rosch, 2015
(NB this is a 28Mb file). http://www.es-uk.info/wp-content/uploads/2018/11/02.2-Tresidderand-Bevington-ES-chapter-47-2015.pdf

- Dieudonné M, 2016: *Does electromagnetic hypersensitivity originate from nocebo responses? Indications from a qualitative study.* https://www.ncbi.nlm.nih.gov/pubmed/26369906

- Bevington M, 2016, a summary of papers on ES http://www.es-uk.info/wpcontent/uploads/2018/05/Selected%20ES%20and%20EHS%20studies.pdf

Please see www.es-uk.info and www.powerwatch.org.uk , and also Prof. Denis Henshaw: www.electricfields.com. The *Powerwatch Handbook* by Alasdair & Jean Philips (Amazon) is recommended.

Electromagnetic Sensitivity by Michael Bevington is an excellent overview with 1828 scientific references, available from ES-UK, BM Box ES-UK, London WC1N 3XX for £12: www.es-uk.info.

Professor Martin Blank's "Overpowered" (2014) is a useful overview, including the politics, Energy Medicine: The Scientific Basis, 2nd Ed, James Oschman, Elsevier 2015 is helpful Dr Mallery-Blythe's excellent scientific overview: "Electromagnetic Radiation, Health and Children" also https://www.youtube.com/watch?v=tRbE4CvKA4Q&feature=youtu.be&t=25693 http://phiremedical.org/category/for-medical-doctors-scientists/

Prof Martin Pall's 'Compelling Evidence for Eight Distinct Types of Great Harm Caused by (EMF) Exposures and the Mechanism that Causes Them' is concerning a 90 page, seven chapter document on EMF effects, how they are produced in the body and the corruption of the international science: http://peaceinspace.blogs.com/files/5g-emf-hazards–dr-martin-l.-pall–eu-emf2018-6-11us3.pdf

Appendix – conflicts of interest and flawed conclusions in science

The 'authoritative' 2012 AGNIR report has been analysed in the following paper, and found to be flawed: https://www.ncbi.nlm.nih.gov/pubmed/27902455 The abstract states "The Advisory Group on Non-ionising Radiation (AGNIR) 2012 report forms the basis of official advice on the safety of radiofrequency (RF) electromagnetic fields in the United Kingdom and has been relied upon by health protection agencies around the world. This review describes incorrect and misleading statements from within the report, omissions and conflict of interest, which make it unsuitable for health risk assessment. The executive summary and overall conclusions did not accurately reflect the scientific evidence available. Independence is needed from the International Commission on Non-Ionizing Radiation Protection (ICNIRP), the group that set the exposure guidelines being assessed. This conflict of interest critically needs to be addressed for the forthcoming World Health Organisation (WHO) Environmental Health Criteria Monograph on Radiofrequency Fields. Decision makers, organisations and individuals require accurate information about the safety of RF electromagnetic signals if they are to be able to fulfil their safeguarding responsibilities and protect those for whom they have legal responsibility. PHE and AGNIR had a responsibility to provide accurate information about the safety of RF fields. "Unfortunately, the report suffered from an incorrect and misleading executive summary and overall conclusions, inaccurate statements, omissions and conflict of interest. Public health and the well-being of other species in the natural world cannot be protected when evidence of harm, no matter how inconvenient, is covered up." One hopes that PHE may wish to reconsider the safety of the AGNIR Conclusions, as the current analysis illuminates serious conflicts of interest and errors within AGNIR's report, and shows either 1) predetermined conclusions, 2) scientific bias, conscious or unconscious (including System Educational Problems), 3) errors in analysis and flawed conclusions, or, 4) less comfortably, that greater forces have required this result ('Active Denial' is a strategy used by individuals, companies and governments to avoid responsibility). There are no other obvious explanations. PHE may have trusted the independence of AGNIR without appreciating these factors, or the System Educational Problems mentioned above.
Some studies trying to elucidate the issue (eg Kings' College London) have reached flawed conclusions. In the otherwise excellent (from the data, method and analysis point of view) BMJ published KCL paper by Rubin in 2006 *Are some people sensitive to mobile phone signals? Within participants double blind randomised provocation study.*

https://www.ncbi.nlm.nih.gov/pubmed/16520326 and
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1440612/
'sham' was not 'sham' – because in 'sham' mode the headset heated itself to a similar degree as when 'active' RF was being transmitted – of course by electricity, generating EM Fields – and the transmissions were changed to 'internal divert' – therefore current was still passing: 'It was possible to divert power in either variant to an internal load to provide sham RF exposure conditions with heating and low frequency magnetic fields similar to the exposure modes'. http://www.mthr.org.uk/documents/MTHRreport2012.pdf p26. Rubin states 'For the sham exposure, a continuous wave signal was generated to ensure that the system heated up to the same degree as the active exposures but was diverted to an internal load instead of being transmitted through the antenna; only minimal leakage of this signal occurred'. For a sensitive person, this, of course, would be an active test – no wonder the paper was unable to state that sensitive subjects had a different experience from sham – because 'sham' was active. (The unfortunate error was to fail to appreciate that signal effects can occur at a wide range of power outputs with sensitive biological systems, and that low frequency magnetic fields similar to the exposure modes may also cause symptoms – as opposed to power (heating) effects which tend to diminish with decreasing power – and therefore to assume that the described 'sham' really was 'sham').

Any lay analysis of the results (fig 2) clearly shows that there are two distinct groups – the controls, who had few symptoms at all at any point through the study, and the sensitives, who after being near the controls at the start, had steadily increasing symptoms (far more than the controls), at all stages after the commencement of the study, until a relative decline after the transmission was switched off at 50 minutes. Rubin comments '**Sensitive participants reported headache-like symptoms in a mean of 70.4% of calls. The next most common symptoms were skin warmth or burning (43.8% of calls), difficulty concentrating (30.0%), and dizziness (20.8%). Very few control participants reported any symptoms in relation to mobile phone signals; the highest mean frequency was for skin warmth or burning (2.9%). For headache, burning sensations, skin sensations, and eye pain we found evidence of a main group effect—sensitive participants reported greater severity.'** Rubin's data shows that in the sensitive group, 2 subjects were excluded due to severe symptoms at baseline, 6 withdrew at stage one (half due to severe symptoms), and 3 at stage 2. He also states 'We also analysed the number of severe reactions seen in each condition, with a severe reaction defined as a participant requesting that an exposure be terminated early or withdrawing from the study entirely after an exposure. **Twenty-six such reactions occurred in the sensitive group (9 withdrawals; 17 early terminations), and none occurred in the control group'.** This is helpful evidence to support the fact that sensitive subjects really do develop symptoms to the point that they have to withdraw – whereas controls do not.

Unfortunately, the conclusion included the sweeping assertion that there is no biological basis - an assertion made in a paper with only 19 references - and no analysis of or reference to the thousands of papers documenting biological evidence on animals and humans available even in 2005, and in opposition to understanding of voltagegated calcium channels effects, amongst other mechanisms. It is most unfortunate that because the authors (mainly psychologists, with no biologists) did not appreciate that the supposed 'sham' (with current passing in a device strapped to the head and transmission happening 'internally') was not sham at all, but active, it was assumed that only psychological mechanisms were involved. The paper's conclusion is 'No evidence was found to indicate that people with self reported

sensitivity to mobile phone signals are able to detect such signals or that they react to them with increased symptom severity. As sham exposure was sufficient to trigger severe symptoms in some participants, psychological factors may have an important role in causing this condition'. This conclusion of course fits with the then prevailing chemistry narrative of medicine rather than an informational physics perspective as explained by Oschman in Energy Medicine, Elsevier, 2000

If one reinterprets the data in this light, and includes a less narrow literature search of relevant human and animal studies (e.g. see the 1828 references in Bevington's 2013 book), the data in Rubin's 2006 paper is truly excellent support of the fact that Electrosensitivity exists. **Rubin could be congratulated upon this research, if the erroneous conclusions made in 2006 were now reframed to the diametrically opposite point of view.** A new conclusion might state: '**Evidence was found to indicate that people with self reported sensitivity to mobile phone signals at even very low levels are able to detect such signals** or that they react to them with increased symptom severity from either active transmission or biologically active internal divert. As even the lower level of exposure originally thought to be sham exposure was sufficient to trigger severe symptoms in all sensitive participants, **this is important evidence that some subjects are sensitive to field strengths dramatically below SAR limits set by ICNIRP, and therefore that reliance upon thermal safety limits alone is invalid. This study disproves the fiction that "non-thermal" equals "non-harmful" '**. (The Insurance industry also has these reservations)

Possible Ways Forward

Fortunately, Engineers are problem solvers, and can create wonderful solutions. RF and wifi everywhere has been designed on the parameters of good connectivity , and the **mistaken presumption that only thermal limits are relevant for safety.**

Ask engineers to design sleep mode as a default for routers, cordless phones etc, and other applications, ask them to research biological modulation to bring harmony into signal, ask them to ensure that peoples' sleeping space is a signal free haven and sanctuary for the organism to recover and rest – and ensure human health – then engineers will always find effective solutions.

Ask the health scientists to acknowledge the issue and to look carefully at how to help susceptible people with high quality nutrition, careful serial supplementation to address (among others) B vitamin and zinc and magnesium deficiencies which are widespread, to look at the human software system and how to strengthen and support it, and to ensure white spots of low or no signal for susceptible people to function in, – and they will find answers

EM Pollution and Electromagnetic Stress – General Advice Sheet
This advice is ahead of its time. It is written with the benefit of experiencing many cases of electrosensitivity. This is a contested area, as 'Safety ALWAYS lags technological advances' (think tyre tread, seat-belts, asbestos, lead in petrol etc.). The reader is asked to research for themselves.

Human health is a delicate balance. It can be adversely affected by interfering factors such as chemical pollution, smoke, pollens, moulds, the food we eat, what we drink, lack of sleep, lack of fresh air, lack of sunlight, lack of fresh water and so on. **Electromagnetic pollution** is

another factor which affects the body. Our bodies were developed in an environment free from man-made EM signals (which are up to 1018 stronger than background), whilst the body uses minute micro-currents for cellular function.

Symptoms may be none, or include tiredness, poor quality sleep, irritability, heart palpitations, headaches and a feeling of pressure in the head, speech and thinking disturbance, brain fog, dizziness, tinnitus, vertigo, tinglings and odd sensations in the limbs, joint pains, rashes and others.

Electromagnetic problems are caused by:

1. **Field effects** from cables and appliances (e.g. lights, hairdryers, washing machines, cookers, bedside radios etc.).
2. **Signal effects** from microwave transmitting technology (e.g. microwave ovens, mobile phone masts, cordless phones, mobile phones, WiFi, wireless routers, Wii devices, laptop computers, wireless printers, alarm sensors, iPads, Blackberries, baby alarms, utility smart meters, wireless central heating controls, and a car's Bluetooth devices.

3. '**Dirty electricity'** also damages health.

The key solution is to **minimize your exposure in the home**, especially during sleep time:
□□**Switch off** wifi routers and cordless phone base stations and any other devices whenever you can – remember the signal is designed to go through walls and throughout the house.
□□Put iPads, phones and other wireless devices onto **airplane mode.**
□□Instead of WiFi, consider a **DLAN wired router** system for computer internet via the ring main.
□□Consider changing alarm sensors to **passive only** (rather than active which use microwaves).
□□Think about **refusing offers** of wireless central heating controls and wireless smart meters.

The Council of Europe recommends a **Precautionary** approach, although current UK Public Health England advice is based on heating effects of transmissions only, not the observed signal effects. The World Health Organization's IARC says that wireless technologies are a **Class 2b possible carcinogen**.

Accepted biological effects of EM fields include: increased childhood leukaemia, adverse effects on sperm production, pregnancy, embryo development and hormones; there are links with depression, Motor Neurone and Parkinson's diseases, several cancers, behavioural problems and cataracts.

Mechanisms include: changes in calcium influx, failure of repair of DNA breaks, blood brain barrier permeability, heat shock protein production, disruption of vital melatonin production (e.g. by blue light from screens), general sympathetic (stress) upregulation of the body and disruption of cell to cell signaling. The overall effect may be to age us all more quickly… Industry pressure may hinder discussion or reporting, or ridicule the 'Canaries in the Coal Mine' who are the early ES sufferers. **Please do not take this on trust: research and make up your own mind! read…**
'The Powerwatch Handbook' by Alasdair Phillips, 'Overpowered' by Martin Blank, and 'Energy Medicine' by James Oschman

SCHEDULE 3

Andrew Tressider's paper

Culture, Technology and Radiofrequency Effects Sep 2019 Andrew Tresidder

Technology can be wonderful and bring great benefits. The story of the last 5000 years is of incremental technological advances, success, and the progressive empowerment of humans with the opportunity to raise human consciousness. We have seen the clearing of forests for agriculture with iron tools, then the wheel, next straight roads to communicate with Rome, aqueducts and bridges. Further revolutions (periods of rapid evolution) have followed. In the Middle Ages, literacy and the printing press, then agricultural, industrial, power generation (wood, coal, oil and electricity), transport (railways then roads on land, ships on sea and air travel), electricity, communication, all allowing communication and personal travel, and the projection of power and will. Recent advances in information technology have allowed amazing leaps forward, and a world wide web, that parallels the invisible web of conscious -ness that permeates everything (according to modern physics – Jude Currivan). Great!

All these human advances allow better, more fulfilled lives for many. It seems as though mankind has mastered external use of the elements of earth, fire, air and water. If the purpose of technological advance is purely to have more comfortable lives, then technology has served us well, despite setbacks. However, if the purpose is to serve the fulfillment of personal potential – that is, the growth of human consciousness, then we may be missing a trick. The Roman Emperors knew how to control the restless million inhabitants of Rome – by diverting them with *panem et circenses* – a free corn supply for bread, and circuses. Perhaps our modern equivalent is plenty of plenty of food and comfort, and 24 hour screen time…

There are three important aspects of problems that apply to Radiofrequency and Electromagnetic (RF or microwave) Field technology:

1 **Safety always lags technology**.

We see this time and again – on the first day of a public railway in Britain, the Liverpool and Manchester, MP William Huskisson was run down by a train. Improvements in safety stopped trains travelling towards each other on the same stretch of track, then signaling became more sophisticated, and so on. The highest rate of road fatalities per mile travelled was in the 1920s – lack of driving skills, unsafe cars, and poor road surfaces all contributed to this. Resistance to safety always comes from the industries – the railways had to be cajoled by the Railway Inspectorate (HMRI), and on roads in the 1960s the introduction of safety belts was resisted by libertarians, anxious to allow people the right to exit a motor car via the front windscreen – and by the manufacturers, because of cost. However, unit costs of safety always reduce with increased production.

2 **Safety limits are set – but by whom, and for whose benefit?**

Current EMF safety limits in much of the Western world are based on the assumption that only thermal (heating, power) effects are hazardous to health. Safety limits set by the body ICNIRP are six minute thermal effects only – if the source heats biological tissue by over 1 degree Celsius within six minutes, there is deemed to be a problem. If it takes 7 minutes, 60 minutes or six hours, then this is not covered by the safety limits. However, biological systems react to extremely low power signals – our eyes can react to a single photon with a cascade of biochemical reactions, whilst our ears can detect a billionth of a watt when in silence - these

are neither power nor thermal effects. Living systems are affected by signal at a power many orders of magnitude below thermal effects. **The adverse effects are Signal, not Power – which invalidates thermal safety limits.** Mechanisms include effects on the voltage gated calcium channels amongst others, and affect fertility and many other systems, thousands of research papers show the adverse effects on biology. Many governments have chosen to follow ICNIRP, which favours industrial output, rather than biological limits - that protect human health, bees, insects, and nature, despite thousands of scientific studies showing harm at levels well below thermal.

Non-thermal does NOT equal non-harmful. Furthermore, parts of the insurance industry describe EM and RF fields as 'pollutants' and decline to provide indemnity cover. Swiss Re warned in 2013 of the potential High Impact of unforeseen risks of electromagnetic fields on a 10 year view
https://media.swissre.com/documents/SONAR_+Emerging_risk_insights_from_Swiss_Re.pdf
What does this say? Also, exposures are often 'talked down' as part of a 'spin' approach – e.g. one company claims that its smart meters only transmit for six seconds a day - the truth in this case is that their meters transmit 14000 times a day for a few microseconds – maybe 6 seconds in total - but we know that 14000 blood curdling screams do not average out as silence.

3 **Sadly, society can be led astray, even into danger.**

Many people use devices, whether mobile phones, pads, tablets, home Wi-Fi, smart meters and so on, on the basis that **"they wouldn't let us use them if they weren't safe, would they?" –** and the technology IS wonderful in providing information and connection. Many of us, especially the young, are addicted to our devices and treat them as comfort blankets – in fact some of the algorithms in the software are designed to hook our attention. Once the hazards of any new technology become apparent, there is always a slow movement from denial (there isn't a problem, there isn't a problem) and "there are a few mad people who say there's a problem" to grudging acceptance "there's only a small problem and it's completely under control" to "Houston, we have a problem" – that is realisation of the major significance of the issue. We've seen this with tobacco, asbestos, lead in petrol, radiation in pregnancy and other issues, all advised as SAFE by the industries involved, and sometimes by health advisers. It is so much easier to *blame the messenger* than listen to the message. But as they say in the airline industry – safety may be expensive, but the cost of a mid-air collision… Also, *cui bono?* Is the rollout of every piece of new tech to the long-term health benefit of the purchaser and society – or more for the profit of the tech developers….How can continuous irradiation of living spaces and vehicles, felt as symptoms and impaired cognitive function by some, be health-giving?

In summary

1. Technological advances can be wonderful and *(sometimes)* bring great benefits.
2. **Safety always lags technology**. Those who profit frequently resist the safety costs
3. Current safety limits are six minute thermal only – this does not respect biology, and is based on the **falsehood that non-thermal equals non-harmful**
4. Harms are often not initially apparent, and are then denied – often using vociferous **active denial,** by those who have vested interests, whether financial or from a belief system. There can be a wanton (hopeful) and groundless **presumption of no harm.**
5. Technology should be used wisely and serve, not master, human development.
6. Science tells us there is a problem, but regulators and industry are not yet listening

The future is potentially hopeful – but ONLY if harms are recognised and mitigated – and consumers **survive** the technology! Some worry about incremental fertility failure, because a girl's oocytes can be damaged by RF from laptops etc, and mitochondria (the 'power houses' of the cell) affected, whilst we know that sperm quality is degraded by RF.

Where next for humanity? Will humanity go where it needs – to help every individual develop their consciousness, awareness and connection, or just travel where it wants to, captivated and dazzled by desire and appetites? Will continued rollout of technology cause us to lose our pollinators and insects, and our own human health (health being harmony of mind, body and spirit, including connection to soul)? Will vested interests and clever lobbyists drown out or subvert common sense and wisdom? Will we continue Active Denial both at personal and institutional levels, or will we wake up to the issue, listen to those who are affected adversely, and learn the ways of health – as well as reducing invisible pollution levels?

Resources regarding health effects of electromagnetic fields, especially Radiofrequency (microwave) radiation

EHTrust.org - https://ehtrust.org/science/research-on-wireless-health-effects/ www.es-uk.info has a great deal of useful material and advice http://phiremedical.org has excellent info, Dr Mallery-Blythe on: https://www.youtube.com/playlist?list=PL7tOWNeoVyQ4w-QBGnq930OwesqVlbJki and http://youtu.be/sNFdZVeXw7M www.es-uk.info www.electricsense.com is informative. http://electromagneticman.co.uk/index.php/case-studies/electrosensitivity-sufferers Consider www.powerwatch.org.uk http://www.radiationresearch.org Prof Pall's latest indictment of the ARPANSA, ICNIRP, FCC approach seems spot on:https://stopsmartmeters.com.au/2019/03/22/emeritus-professor-martin-pall-slams-arpansa-response/ 5G Martin Pall https://youtu.be/bsaB7ewFsN0?list=PL7tOWNeoVyQ4w-QBGnq930OwesqVlbJki&t=1416 non ionising radiation strategy group meeting november 5 on youtube 2018http://www.theecologist.org/News/news_analysis/2988521/krakows_bold_step_to_curb_electromagnetic_pollution_reflects_growing_evidence_of_harm.html www.emfields-solutions.com www.electric-fields.com (Prof Denis Henshaw, Bristol, a pioneer in awareness of the issue) Energy Medicine by James Oschman, 2015 Elsevier is useful, http://www.es-uk.info/wp-content/uploads/2018/11/02.2-Tresidder-and-Bevington-ES-chapter-47-2015.pdf http://www.es-uk.info/wp-content/uploads/2018/11/01.2-GP-letter-to-doctors-and-psychiatrists-8-pages-Nov.2017.pdf https://www.electricsense.com/is-5g-dangerous/ https://www.youtube.com/watch?v=EytG0se9hCE&list=PLEAowARbUhT2kYSYdbIgqYQ4XhMtKNVve&index=5

SCHEDULE 4

Agencies involved

UK

Dept. of Health and Social Care (DHSC)

Chief Medical Officer (CMO) for England, Chief Medical Advisor to the UK government and Chief Scientific Adviser for the Department of Health and Social Care (DHSC)

Public Health England (PHE)

Parliamentary Health and Social Care Select Committee

Parliamentary Science & Technology Select Committee

Advisory Group on Non-Ironising Radiation (AGNIR) disbanded by PHE in May 2017 and its responsibilities transferred to COMARE (Committee on Medical Aspects of Radiation in the Environment)

National Institute for Health Research (NIHR)

International

World Health Organisation

EU Commission

Council of Europe

International Commission on Non-Ionizing Radiation Protection (ICNIRP)

UN

SCHEDULE 5

Public Health England's responses to health concerns of 5G

A. Correspondence with one person referred to as MS for the purposes of this note

From: Phe.Complaints [mailto:Phe.Complaints@phe.gov.uk]
Sent: 12 July 2019 13:31
To: MS
Cc: Phe.Complaints <Phe.Complaints@phe.gov.uk>
Subject: OFFICIAL: Your complaint to Public Health England

OFFICIAL

Dear MS

Complaint reference:

Thank you for your emails to Public Health England (PHE) dated 12 June and 18 June 2019.

You have complained that Dr Simon Mann, Head of Radiation Dosimetry within the Centre for Radiation, Chemical and Environmental Hazards directorate at PHE, has made a statement in respect of 5G technology which is *"demonstrably dishonest".* You have said that Dr Mann stated that *"as far as PHE are aware, 5G is safe."* You have asked what published, peer-reviewed research Dr Mann can be referencing to support this statement.

You have not specified which BBC news programme contained this appearance by Dr Mann. He recently made a contribution to a segment about the health implications of 5G on BBC Points West. Dr Mann stated, *"We are fairly confident that it can be regarded as safe."*

Dr Mann's contribution to the BBC Points West segment was restricted to a single sentence. His full comments to the programme makers were heavily edited and the brief statement he did make clearly did not purport to contain or represent the full and considered PHE position on non-ionising radiation. The full broadcast of the BBC Points West segment can be found at the following link:

https://www.dropbox.com/s/df8yp7khb6rdz3i/5G_240619_for%20dropbox_exarchive-h264.mov?dl=0

Public Health England (PHE) advises the UK Government on the public health aspects of exposure to radio waves, including those associated with 5G and other radio transmitters in the environment.

Our position on this topic is covered in the attached briefing note, and the official guidance on mobile phone masts, also covering the topic of 5G, can be accessed using the following link:

https://www.gov.uk/government/publications/mobile-phone-base-stations-radio-waves-and-health/mobile-phone-base-stations-radio-waves-and-health

Central to PHE's advice is that exposures to radio waves should comply with the guidelines published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP is formally recognised by the World Health Organization (WHO). This position is

underpinned by various formal reviews of the scientific evidence suggesting that exposure to radio waves below ICNIRP guidelines do not cause adverse health effects, as explained in the aforementioned webpage.

PHE strongly refutes your allegation of dishonesty on the part of Dr Mann. PHE expects all of it staff to adhere to its Code of Conduct and to *"conduct ourselves openly and transparently, with integrity, impartiality and honesty – we shall never deceive or knowingly mislead others including customers, the public, colleagues, the Department of Health, Ministers or Parliament."* We have unequivocal confidence in the integrity of Dr Mann.

The contents of this email represent PHE's initial response to your complaint. If you are dissatisfied with this response, you can ask to have your complaint reviewed independently by a member of the PHE management team. You must write to us within 20 working days if that is your wish.

Your sincerely

David Dewar

Complaints Officer

Public Accountability Unit

Public Health England

Wellington House

133 – 155 Waterloo Road

London
SE1 8UG

From: MS
Sent: 18 June 2019 11:53
To: Phe.Complaints <Phe.Complaints@phe.gov.uk>
Subject: RE: OFFICIAL: Your email to Public Health England

Dear David

A Recent BBC news programme a person reporting to be from PHE, Simon Mann stated that as far as PHE are aware, 5G is safe. This is demonstrably a dishonest statement and Mann should be aware of this as no safety testing or data is available to show it is safe. The same dishonest regurgitation of that information is currently used by others referring to PHE as their source. What published peer reviewed research is Mann referencing to support what is demonstrably dishonest reporting of 5G. Intent to harm the Citizen is a crime, testing experimental technology on the Citizen is also in breach of the Nuremberg code all Public servants should be aware of that.

MS

From: MS
Sent: 12 June 2019 14:15

To: PHE.enquiries <PHE.Enquiries@PHE.gov.uk>
Subject: Complaint

I require your complaint procedure so I can take issue with dishonest information coming from individuals at PHE.

Yours Sincerely.

MS

We do not pay public servants to misinform the public.

PHE BRIEFING NOTE SENT TO MS WITH ABOVE EMAIL

Public Health England – Information on mobile telecommunications technology

Mobile telecommunications technology has developed through several generations and there are now many 2G, 3G and 4G base stations installed throughout the environment providing services to users of mobile phones and other devices. Over the decades since the networks were first introduced there has been a general trend towards increasing numbers of smaller transmitters that individually provide services to smaller geographical areas and which have reducing radiated powers. Against this background, many measurements have been made and these continue to show that exposures of the general public to radio waves are well within the international health-related guideline levels that are used in the UK. These guidelines are from the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and underpin health protection policies at UK and European levels.

In relation to the implementation of 5G user devices and networks, this technology is at an early stage and reflects the latest evolution in mobile communications technology. Current technical standards that draw on the ICNIRP guidelines will apply to the products that are developed and the UK network operators are already committed to complying with the ICNIRP guidelines.

With the increase in the volume of information being transferred, more spectrum is being made available and the highest frequencies being discussed for future use by 5G are around ten times higher than those used by current network technologies, up to a few tens of GHz. Their use is not new, and they have been used for point-topoint microwave links and some other types of transmitters that have been present in the environment for many years. ICNIRP guidelines apply up to 300 GHz, well beyond the maximum (few tens of GHz) frequencies under discussion for 5G.

Exposure to radio waves is not new and health-related research has been conducted on this topic over several decades. In particular, a large amount of new scientific evidence has emerged over the past few years through dedicated national and international research programmes that have addressed concerns about rapidly proliferating wireless technologies.

The main focus of recent research studies has been on exposure to the types of radio signals used by current communications technologies and at the frequencies they use, up to a few GHz. Fewer studies have been carried out at higher frequencies but the biophysical mechanisms that govern the interaction between radio waves and body tissues are well

understood at higher frequencies and are the basis of the present ICNIRP restrictions. The main change in using higher frequencies is that there is less penetration of radio waves into body tissues and absorption of the radio energy, and any consequent heating, becomes more confined to the body surface.
It is possible that there may be a small increase in overall exposure to radio waves when 5G is added to an existing network or in a new area; however, the overall exposure is expected to remain low relative to guidelines and as such there should be no consequences for public health.

Further information

Public Health England's (PHE's) Centre for Radiation, Chemical and Environmental Hazards (CRCE) takes the lead on public health matters associated with radiofrequency electromagnetic fields, or radio waves, used in telecommunications.

A summary of PHE advice on radio waves can be accessed in the following link:

https://www.gov.uk/government/collections/electromagnetic-fields#radio-waves

PHE is committed to monitoring the evidence applicable to this and other radio technologies, and to revising its advice, should that be necessary.

B. ANOTHER PERSON'S EXPERIENCE OF PHE WHEN THEY RAISED HEALTH CONCERNS REFERRED TO AS B FOR THE PURPOSES OF THIS SCHEDULE

From: emf.enquiries <emf.enquiries@phe.gov.uk>

Subject: RE: OFFICIAL: Involuntary prolonged exposure to radiofrequency electromagnetic radiation

Date: 12 June 2019 at 10:10:16 BST

To: B

Cc: PHE.enquiries <PHE.Enquiries@PHE.gov.uk>

OFFICIAL

Dear B,

Thank you for your latest e-mail.

In the situation you describe with the tree surgeons, ICNIRP occupational exposure guidelines would apply and the general public guidelines are more stringent than those for workers.

Also, companies have agreed safety practices and employees are expected to be provided with information and training about any potential risks.

We would be happy to advise the tree surgeon company about occupational exposure guidelines if they contact us.

Best Regards

Darren Addison

Electromagnetic Fields Group

Public Health England

Centre for Radiation, Chemical and Environmental Hazards

Chilton, Didcot

Oxfordshire, OX11 0RQ

United Kingdom

Web site: www.gov.uk/phe

Protecting and improving the nation's health

Please consider the environment before printing this email

From: B
Sent: 07 June 2019 10:51
To: emf.enquiries <emf.enquiries@phe.gov.uk>
Subject: Re: OFFICIAL: Involuntary prolonged exposure to radiofrequency electromagnetic radiation

Dear Darren Addison,

many thanks for your reply.

I am sorry to have to tell you that you are wrong in your assumption that members of the public cannot unknowingly enter areas close to the antennae where exposure may exceed the relevant guidelines.

A week ago two tree surgeons were sent to "reshape" one of two very large trees which are located either site of one of the base stations. (As you might know, trees and 5G are incompatible).

The tree surgeons were totally unaware of the fact that they were working in close proximity to a live antennae and that the top of the tree they were working on is in a public exclusion zone.

You will also see from the information I have sent you see that there is an open access deck for the residents to reach their flats which is within the public exclusion zone. There are no warning signs anywhere.

Best Regards

B

On 6 Jun 2019, at 13:59, emf.enquiries <emf.enquiries@phe.gov.uk> wrote:

OFFICIAL

Dear B,

PHE does not offer an individual assessment service in these types of situations, as the levels fall well below guideline limits. We have provided you with PHE's advice on the subject, which includes information on exposures in the vicinity of mobile phone masts, and on exclusion zones.

As suggested previously, if you remain concerned, the operator of the mast should be able to provide you with assurances that your home is not in the public reference level exclusion zone, as they are obliged to comply with the guidelines through planning guidance, and health and safety legislation. Compliance with ICNIRP public exposure guidelines is achieved by careful location of antennas, access restrictions and/or barriers and signage as necessary. Members of the public cannot unknowingly enter areas close to the antennas where exposure may exceed the relevant guidelines.

Best Regards,

Darren Addison

Electromagnetic Fields Group

Public Health England

Centre for Radiation, Chemical and Environmental Hazards

Chilton, Didcot

Oxfordshire, OX11 0RQ

United Kingdom

Web site: www.gov.uk/phe

Protecting and improving the nation's health

Please consider the environment before printing this email

From: B
Sent: 05 June 2019 13:54
To: emf.enquiries <emf.enquiries@phe.gov.uk>
Subject: Re: OFFICIAL: Involuntary prolonged exposure to radiofrequency electromagnetic radiation

Dear Darren Addison,

Many thanks you for your quick response.

I have just visited the ICNRIP website in order to find out site specific information about what the exclusion zone mean in practise.

This is the message I found there:

For specific local exposure appraisal, please contact the radiation protection agency of your country.

Is that not you?

Best Regards

B

On 5 Jun 2019, at 09:24, emf.enquiries <emf.enquiries@phe.gov.uk> wrote:

OFFICIAL

Dear B,

Thank you for your follow-up e-mail.

The exclusion zones around the base station are there to ensure that members of the public and workers are not exposed above the respective ICNIRP general public and occupational guidelines. Please note the exclusion zones vary with height as well as distance from the antenna, as explained in the earlier PHE advice link we sent you.

The strength of the radio waves from base-station antennas falls off very quickly with increasing distance. So, radiofrequency fields at ground level and in places normally accessible to the public are many times below guideline levels.

If you think areas of your home are within an exclusion zone, you could check with the operator of the mast to make sure this is not the case, as per in my original reply. Please note that PHE has an advisory role and is not a regulator. Control of exposures at telecommunications sites is exercised through health and safety legislation, and through planning legislation.

Relating to the medical problems that you are experiencing, we urge you to contact your GP who is best placed to consider your current health problems and can arrange appropriate treatment if needed. Likewise, we recommend the other resident with medical concerns also speaks to their GP.

Regarding your other comments, PHE acknowledges the difficulty in development of exposure protection guidance, which is that the interpretation of studies of potential health effects is a matter of judgement, and there is a spectrum of opinion within the scientific community and elsewhere. In formulating its advice, PHE aims to draw out a consensus position based on the totality of the scientific evidence through a process of systematic, critical and impartial review of the published literature. This is the approach adopted by officially mandated authoritative organisations such as, ICNIRP and WHO and I hope this provides the assurances sought.

Best Regards,

Darren Addison

Electromagnetic Fields Group

Public Health England

Centre for Radiation, Chemical and Environmental Hazards

Chilton, Didcot

Oxfordshire, OX11 0RQ

United Kingdom

Web site: www.gov.uk/phe

Protecting and improving the nation's health

Please consider the environment before printing this email

From: B
Sent: 04 June 2019 00:22
To: necl.team <necl.team@phe.gov.uk>
Subject: Re: OFFICIAL: Involuntary prolonged exposure to radiofrequency electromagnetic radiation

Dear Darren Addison,

Many thanks for your prompt reply.

Further to the answers you have given me I would now like you to clarify the following specific questions:

1. Regarding the plan I sent you showing the ICNIRP exclusion zones protruding into our garden at No. 54 Falkland Road (a more accurate updated version is attached below):

What do these exclusion zones mean for us day to day? Is it safe for us residents and any visitors we have to go into this exclusion zone? Can we spend prolonged periods of time in there?

2. You say that PHE does not anticipate any adverse health effects from the new 5G technology but will review this advice should the science change.

Does this mean that PHE is adopting a wait and see attitude regarding the effects on health of this new technology? Are we and our neighbours part of a human trial?

3. Not only is 5G a new technology in a test phase, so is the Huawei equipment. Is PHE happy for foreign companies testing their equipment on the UK population?

4. If we decide to sell or rent out our house will someone at PHE guarantee the safety of a prospective buyer or tenant and their families?

5. Is PHE aware of the fact that the ICNIRP is a self appointed and self regulating industry-led private organisation registered in Germany not a publicly appointed and accountable body?

6. Is PHE aware of the fact that the ICRNIP guidelines on mobile phone mast safety were established in the 1990s and are solely based on the belief that only acute thermal effects of low intensity non-ionising radiation are harmful?

7. Is PHE aware of the fact that the telecommunications industry has conducted ZERO independent research into the effect on human and wildlife health by prolonged exposure to radiofrequency electromagnetic radiation and has NOT pledged any money to research this topic in future?

8. Is PHE aware of the wealth of independent research showing the harmful effects of prolonged exposure to previously lower levels of radiofrequency radiation when there was only 2, 3 and 4G?

(I would be very happy to send you information regarding this if you don't have it).

8. Is PHE aware of the fact that the WHO has classified radiofrequency electro magnetic fields as possibly carcinogenic to humans (Group 2b) as early as 2011?

In conclusion I would like to point out the following:

PHE's apparent laissez faire attitude to telecommunication companies exposing large numbers of the UK population to a new and never tested technology is akin to forcing the same people to take a new drug that has not undergone ANY medical trials without asking for their consent.

And unless you live in areas so far unaffected by 5G, you, the employees of PHE will not be exempt from being exposed to these experiments yourselves.

I would also like to share with you the fact that for days now I have had a persistent headache, nausea, high levels of anxiety, palpitations, a constant humming sound in my ears, itching skin and other symptoms which recede when I go into green wooded spaces. Of course it might all be in the mind but I've just spoken to a friend who reported many of the same symptoms and had attributed them to her Leukemia as she had never heard of 5G.

I look forward to hearing from you soon

Best Regards

B

Dear B,

Public Health England (PHE) advises the UK Government on the public health aspects of exposure to radio waves, including those from mobile phone base stations and other radio transmitters in the environment, of which the 5th Generation (5G) of mobile telecommunications technology will be one of them.

PHE's advice on this subject is available in the following link:

https://www.gov.uk/government/publications/mobile-phone-base-stations-radio-waves-and-health/mobile-phone-base-stations-radio-waves-and-health

Central to PHE's advice is that exposures to radio waves should comply with the guidelines published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP is formally recognised by the World Health Organization (WHO). This position is underpinned by various formal reviews of the scientific evidence suggesting that exposure to radio waves below ICNIRP guidelines do not cause adverse health effects, as explained in the attached PHE RF advice summary document. I am also attaching our 5G lines, which I hope is helpful.

The key point is that the mobile phone network operators are committed to ensuring that all sites comply with the guidelines of ICNIRP, which form the basis for PHE advice.

See below for the mobile phone network operators code of best practice on mobile network development in England.

http://www.mobileuk.org/codes-of-practice.html

If you are still concerned, can I suggest that you contact the mobile phone network operator responsible for the mast and request assurances that the ICNIRP public exposure guidelines will be complied with in the area where your property is located.

We recognise there are concerns about the rollout of 5G; however, PHE's view is that no negative effects on public health are anticipated and that the higher frequencies being considered are already

covered by current exposure guidelines. That said, we continue to monitor the science and would have no hesitation to review our advice if it became necessary to do so.

It is not possible to comment on the readings you quote from your meter, other than to say some caution needs to be exercised as such measurements are quite complicated to make and interpret.

PHE has no regulatory powers on planning aspects of mobile sites.

Best Regards

Darren Addison

From: B>
Sent: 30 May 2019 09:50

Dear Sir or Madam,

we have been living in close proximity to a Huawei mobile phone base station on Camden Council owned XXX for some time now.

Two weeks ago the old Huawei antennae were replaced with new 5G compatible Huawei infrastructure and I was told that 5G will go live in early June.

You might be aware that Bruxelles and Geneva have halted the 5G rollout because of health concerns.

Alerted by this fact to the possible risks associated with this new and so far untested 5G technology and following some research into the existing mobile network technology I purchased a radio frequency acoustimeter and have been measuring the exposure in our bedroom which directly faces the antennae.

On the consecutive days I did the measuring the exposure levels at nighttime were considerably higher than during the day, I attach a short film of the readings taken on May 28th just before midnight (the readings last night were even higher).

I have been trying to find out from our Camden Council which licences have been granted and when but have not had a reply yet. I therefore do not know whether we have been exposed to these high levels of radiofrequency electromagnetic radiation for days, weeks, months or even years whilst being asleep.

The reason for writing to you now is to alert you to these local exposure levels and also to ask you for your reassurance that our health and that of all our neighbours (many of them children) has not and won't in future be compromised and endagered by the antennae installation on Willingham Close and other existing and planned installations in our neighbourhood.

Please also provide us with the appropriate independent long term studies, confirming that there are no risks associated with involuntary prolonged exposure to radiofrequency electromagnetic radiation.

In addition to the film I attach a map I made using the Broadband UK installation drawings (please note the exclusion zones overlapping buildings, gardens and a playground), a photo of the installation and a link to a recent article in the Lancet calling for an urgent assessment of the impact of planetary electromagnetic pollution.

If you need any further information please don’t hesitate to contact me.

Best regards

B

SCHEDULE 6
ARTICLE RE DR LERCHL

On the same day that the EC's SCENIHR released their long-awaited report [1] that concluded that we should not worry about any adverse health effects of EMF/RF fields, a new well conducted replication study [2] shows that long-term 3G/UMTS microwave exposure can act as a co-carcinogen and statistically significantly increase cancer growth at very low exposure levels, 50-fold below currently permitted levels.

Everyone using a 3G mobile phone or iPad or other tablet will be exposed at higher levels than this (0.04 W/kg). This study flags a big and important "wake up alarm call".

These are levels that many, if not most, of our children are now being being exposed to WiFi at school, when using laptops and tablet PCs. Modern WiFi signals use RF modulation schemes that are similar to UMTS. It is vital that this study is repeated using similar exposure levels with various types and frequencies of WiFi.

In our opinion this is a crucial replication study that provides confirmation in a well-conducted *in-vivo* animal study that modulated microwave RF exposure can act as a co-carcinogen. This should be adequate to change its IARC 2B rating (possible human carcinogen) into the 2A category (probable human carcinogen).

The team was led by Professor Dr Alexander Lerchl and funded by a grant from the German Federal Office for Radiation Protection (BfS), Salzgitter, Germany. The funding agency defined the principal study design which was further developed with Dr Lerchl. The authors declare no conflicts of interest. In the past Dr Lerchl has been outspoken in his belief that current science had shown that low levels of microwave RF exposure could not be carcinogenic, so publication of this new, well conducted, study that shows the opposite is to his credit.

We call on the EC to issue a warning to the general public, and especially schools, and to urgently authorise funding for repeating this work using exposures to the the various WiFi modulation standards as soon as possible. As a UK-based group, we also call on the UK Department of Health to revise their Public Health England organisation's website advice that currently supports schools in their use of WiFi for children of all ages. Powerwatch has long believed that this is unethical and we have repeatedly called for WiFi exposure related health research which, to our knowledge, has not been done by any official organisation.

The authors write:

"Previously published results from a pilot study with carcinogen-treated mice, however, suggested tumor-promoting effects of RF-EMF (Tillmann et al, 2010). We have performed a replication study using higher numbers of animals per group and including two additional exposure levels (0 (sham), 0.04, 0.4 and 2 W/kg SAR)... Numbers of tumors of the lungs and livers in exposed animals were significantly higher than in sham-exposed controls. In addition, lymphomas were also found to be significantly elevated by exposure. A clear dose-response effect is absent. We hypothesize that these tumor promoting effects may be caused by metabolic changes due to exposure."

"Our study confirms and extends the previously published observations of tumor-promoting effects of life-long RF-EMF exposure... Since many of the tumor-promoting effects in our study were seen at low to moderate exposure levels (0.04 and 0.4 W/kg SAR), thus well below exposure limits for the users of mobile phones."

"The fact that both studies found basically the same tumor-promoting effects at levels below the accepted (and in most countries legally defined) exposure limits for humans is worrying. Although animal experiments are generally not easily transferable to the situation in humans, the findings are a very clear indication that - in principal - tumor-promoting effects of life-long RF-EMF exposure may occur at levels supposedly too low to cause thermal effects."

Some more details of the study:

In 2010, Tillmann and colleagues published a study [3] showing tumour-promoting effects of life-long exposure to microwave RF from 3G (UMTS) at moderate exposure levels in mice treated with a carcinogen while *in-utero*. Those results were potentially influenced by an unexpected infection. Their data showed clear effects of RF-EMF exposure on the incidences of lung and liver tumours. The exposed mice also had double the number of metastasising lung tumours compared with the non-exposed mice. SCENIHR 2015 does mention the Tillmann, et al, study on page 85 and say that a further study "might be informative", but also state that peak exposures were high (5 W/kg), implying that there might be some thermal effect.

Lerchl's team have replicated this study with higher numbers of mice per group in order to clarify whether the previously reported results could be confirmed. In addition, two additional SAR levels of exposure (low and high) were included in this well designed new study in order to investigate possible dose-response relationships.

What they have found are co-carcinogenic promotional effects at all levels of UMTS RF/microwave exposure. In fact, the lowest level of exposure shows the highest, statistically significant, promotional effect. Please see the Figure (above) reproduced from the paper.

The paper is available from the journal's website, linked below.

We call on the German BfS to fund the Open Access publication of this paper. Most modern Public (tax) and Charity funded research now has a stipulated requirement for the results to be published as an Open Access (freely downloadable) paper and a sum is given in the grant to allow for this. This only involves the funders paying a few thousand euros (or USD) to the publishers, which is a small sum compared with the cost of the actual research.

References

1/. » The 2015 SCENIHR Opinion *(PDF download)*

2/. » A. Lerchl, M. Klose, K. Grote, A.F.X. Wilhelm, O. Spathmann, T. Fiedler, J.Streckert, V. Hansen, M. Clemens, Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans, Biochemical and Biophysical Research Communications (2015), doi: 10.1016/j.bbrc.2015.02.151

3/. » T. Tillmann, H. Ernst, J. Streckert, et al., Indication of cocarcinogenic potential of chronic UMTS-modulated radiofrequency exposure in an ethylnitrosourea mouse model, Int. J. Radiat. Biol. 86 (2010)

This page was last updated at 06:48 GMT on 8 March 2015

SCHEDULE 7
EXTRACTS OF 2020 ICNIRP GUIDELINES

ICNIRP's guidelines state:

"These guidelines specify quantitative EMF levels for personal exposure. Adherence to these levels is intended to protect people from all substantiated harmful effects of radiofrequency EMF exposure. To determine these levels, ICNIRP first identified published scientific literature concerning effects of radiofrequency EMF exposure on biological systems, and established which of these were both harmful to human health3 and scientifically substantiated. This latter point is important because ICNIRP considers that, in general, reported adverse effects of radiofrequency EMFs on health need to be independently verified, be of sufficient scientific quality and consistent with current scientific understanding, in order to be taken as "evidence" and used for setting exposure restrictions. Within the guidelines, "evidence" will be used within this context, and "substantiated effect" used to describe reported effects that satisfy this definition of evidence.

The reliance on such evidence in determining adverse health effects is to ensure that the exposure restrictions are based on genuine effects, rather than unsupported claims. However, these requirements may be relaxed if there is sufficient additional knowledge (such as understanding of the relevant biological interaction mechanism) to confirm that adverse health effects are reasonably expected to occur.

For each substantiated effect, ICNIRP then identified the "adverse health effect threshold;" the lowest exposure level known to cause the health effect. These thresholds were derived to be strongly conservative for typical exposure situations and populations. Where no such threshold could be explicitly obtained from the radiofrequency health literature, or where evidence that is independent from the radiofrequency health literature has (indirectly) shown that harm could occur at levels lower than the "EMF-derived threshold," ICNIRP set an "operational threshold." **These are based on additional knowledge of the relation between the primary effect of exposure (e.g., heating) and health effect (e.g., pain)**, to provide an operational level with which to derive restriction values in order to attain an appropriate level of protection. Consistent with previous guidelines from ICNIRP, reduction factors were then applied to the resultant thresholds (or operational thresholds) to provide exposure restriction values. Reduction factors account for biological variability in the population (e.g., age, sex), variation in baseline conditions (e.g., tissue temperature), variation in environmental factors (e.g., air temperature, humidity, clothing), dosimetric uncertainty associated with deriving exposure values, uncertainty associated with the health science, and as a conservative measure more generally."

...

“From a health risk perspective, we are generally interested in how much EMF power is absorbed by biological tissues, as this is largely responsible for the heating effects described above.”

There is evidence of harm from pulsed waves, but ICNIRP states:

“Similarly, as there is no evidence that continuous (e.g., sinusoidal) and discontinuous (e.g., pulsed) EMFs result in different biological effects (Kowalczuk et al. 2010; Juutilainen et al. 2011), no theoretical distinction has been made between these types of exposure (all exposures have been considered empirically in terms of whether they adversely affect health).”

Pg 518

“It is important to note that ICNIRP bases its guidelines on substantiated adverse health effects. This makes the difference between a biological and an adverse health effect an important distinction, where only adverse health effects require restrictions for the protection of humans. Research on the health effects of radiofrequency EMFs has tended to concentrate on a few areas of particular interest and concern, with some other areas receiving little or no attention. There is not sufficient research addressing potential relations between radiofrequency EMFs and the skeletal, muscular, respiratory, digestive, and excretory systems, and so these are not considered further. This review considers the potential for different types of radiofrequency EMF exposure to adversely affect health, including sinusoidal (e.g., continuous wave) and non-sinusoidal (e.g., pulsed) EMFs, and both acute and chronic exposures.”

From pages 518 – 523, it explains why it rejects many studies showing harm.

“SUMMARY The only substantiated adverse health effects caused by exposure to radiofrequency EMFs are nerve stimulation, changes in the permeability of cell membranes, and effects due to temperature elevation. There is no evidence of adverse health effects at exposure levels below the restriction levels in the ICNIRP (1998) guidelines and no evidence of an interaction mechanism that would predict that adverse health effects could occur due to radiofrequency EMF exposure below those restriction levels.”

SCHEDULE 8

PARLIAMENTARY DEBATES

Parliament debate - Health-related effects of electromagnetic fields and 5G Parliament Debate

https://youtu.be/9F-hrA9AmSI

The transcript is at:

https://hansard.parliament.uk/Commons/2019-06-25/debates/7D18471E-627A-41C4-B338-11F278CEA9B7/ElectromagneticFieldsHealthEffects

Parliament's Science and Technology Select Committee - Here is the clip from S&T committee when they questioned the Chief Medical Officer about 5G in June. FFwd to 10.17am on the playback

https://parliamentlive.tv/Event/Index/b5b62411-6bc2-4e88-af13-bd6ea8086610

The response to Ms Fellows' 2nd 5G question https://www.theyworkforyou.com/wrans/?id=2019-09-27.291574.h

5g health hazards B4237 : 2 Written Answers

Written Answers - Department of Health and Social Care: 5G: Health Hazards (2 Oct 2019)
https://www.theyworkforyou.com/wrans/?id=2019-09-24.290392.h&s=5G+Health+Hazards
Marion Fellows: To ask the Secretary of State for *Health* and Social Care, which organisations his Department consulted on the effect of 5G towers on public *health*.

Written Answers - Department of Health and Social Care: 5G: Health Hazards (2 Oct 2019)
https://www.theyworkforyou.com/wrans/?id=2019-09-27.291574.h&s=5G+Health+Hazards
Sarah Wollaston: To ask the Secretary of State for *Health* and Social Care, what recent assessment he has made of the level of risk to *health* posed by 5G connectivity.

B4237 speaker:Amber Rudd : 1 Commons debate
==========

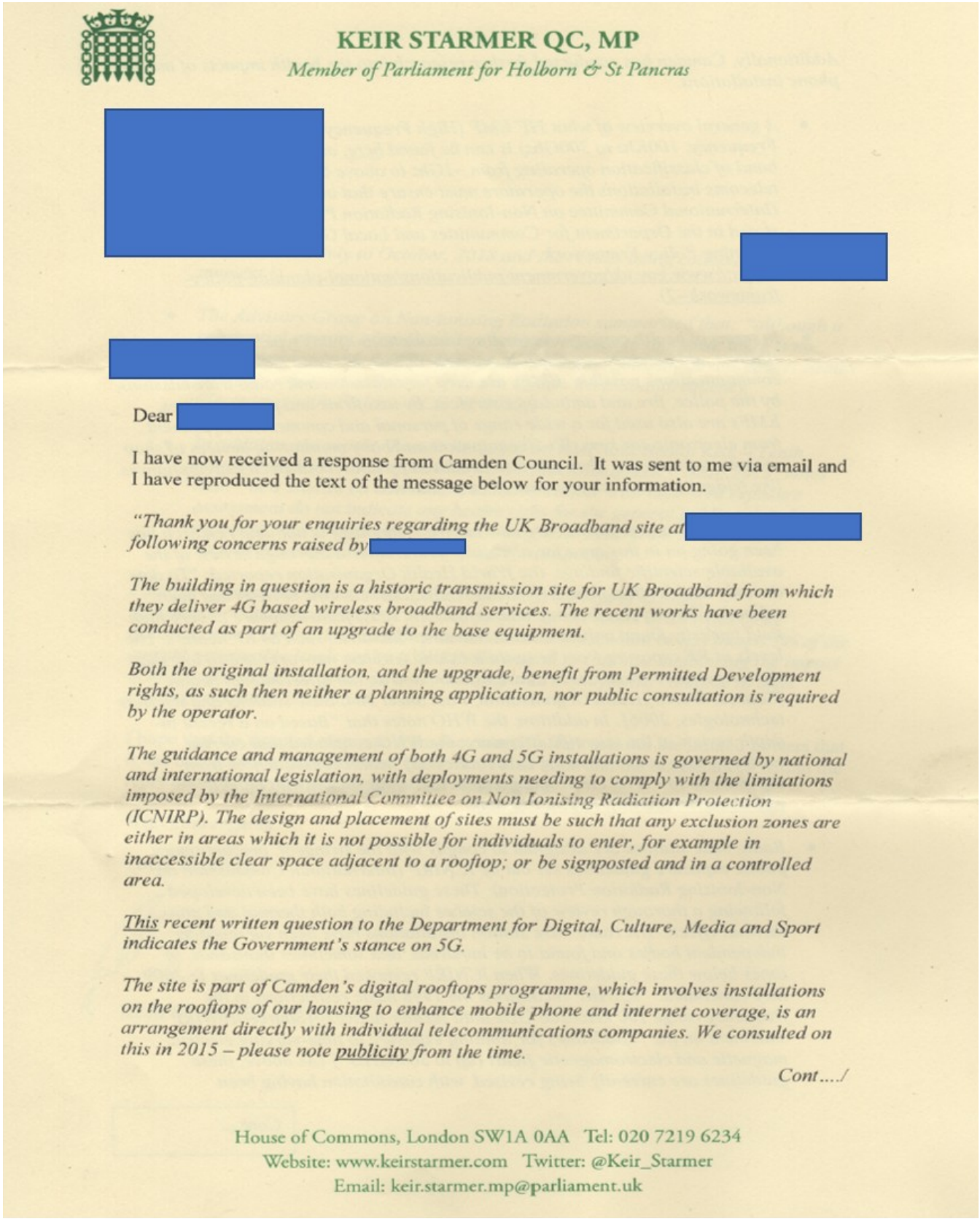
Oral Answers to Questions - Prime Minister: Engagements (2 Oct 2019)
https://www.theyworkforyou.com/debates/?id=2019-10-02a.1215.2&s=speaker%3A24795#g1223.4
Amber Rudd: I congratulate my right hon. Friend on his role today. I remember when my right hon. Friend resigned from the Cabinet because of his disagreements with Brexit policy—a route I subsequently became familiar with—but does his experience not remind him that there are honourable, different opinions across this House about how we leave the European Union and about how we interpret the will of...

SCHEDULE 9

CORRESPONDENCE WITH MPS KEIR STARMER QC AND TULIP SIDDIQ

A. Correspondence with Keir Starmer QC

This is the correspondence between the lady from Kentish Town ("B") and Mr Starmer QC.



KEIR STARMER QC, MP

Member of Parliament for Holborn & St Pancras

[redacted]

[redacted]

[redacted]

Dear [redacted]

I have now received a response from Camden Council. It was sent to me via email and I have reproduced the text of the message below for your information.

"Thank you for your enquiries regarding the UK Broadband site at [redacted] following concerns raised by [redacted]

The building in question is a historic transmission site for UK Broadband from which they deliver 4G based wireless broadband services. The recent works have been conducted as part of an upgrade to the base equipment.

Both the original installation, and the upgrade, benefit from Permitted Development rights, as such then neither a planning application, nor public consultation is required by the operator.

The guidance and management of both 4G and 5G installations is governed by national and international legislation, with deployments needing to comply with the limitations imposed by the International Committee on Non Ionising Radiation Protection (ICNIRP). The design and placement of sites must be such that any exclusion zones are either in areas which it is not possible for individuals to enter, for example in inaccessible clear space adjacent to a rooftop; or be signposted and in a controlled area.

This recent written question to the Department for Digital, Culture, Media and Sport indicates the Government's stance on 5G.

The site is part of Camden's digital rooftops programme, which involves installations on the rooftops of our housing to enhance mobile phone and internet coverage, is an arrangement directly with individual telecommunications companies. We consulted on this in 2015 – please note publicity from the time.

Cont..../

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Email: keir.starmer.mp@parliament.uk

Additionally, Camden has conducted further research into the health impacts of mobile phone installations.

- *A general overview of what HF EMF (High Frequency Electro-Magnetic Frequency, 100Khz to 300Ghz) is can be found here, and 5G falls into this same band of classification operating from ~1Ghz to above 6Ghz. With all of the telecoms installations the operators must ensure that all equipment is ICNIRP (International Committee on Non-Ionising Radiation Protection) compliant, as stated in the Department for Communities and Local Government's National Planning Policy Framework (https://www.gov.uk/government/publications/national-planning-policy-framework--2).*

- *In terms of health concerns regarding installations of this type, radio base stations and handsets use EMF to transfer information and make mobile phone communications possible. EMFs are used for television and radio transmissions, by the police, fire and ambulance services, by taxi firms and public utilities. EMFs are also used for a wide range of personal and commercial equipment from electronic car keys, Wi-Fi equipment and baby monitoring devices to shop security tag systems. They are also produced by household electrical appliances like fridges, vacuum cleaners or electric shavers.*

- *Mobile phones and devices are new but the technology is not, and research has been going on in this area for almost 75 years. After a thorough review of the available scientific findings, the World Health Organisation reported: "To date, the only health effect from RF fields identified in scientific reviews has been related to an increase in body temperature (> 1 °C) from exposure at very high field intensity found only in certain industrial facilities, such as RF heaters. The levels of RF exposure from base stations and wireless networks are so low that the temperature increases are insignificant and do not affect human health" [Source: World Health Organisation, Fact Sheet 304, Base stations and wireless technologies, 2006]. In addition, the WHO notes that "Based on a recent in-depth review of the scientific literature, the WHO concluded that current evidence does not confirm the existence of any health consequences from exposure to low level electromagnetic fields". http://www.who.int/peh-emf/about/WhatisEMF/en/index1.html*

- *Radio base stations are designed to comply with the stringent, precautionary public exposure guidelines set out by ICNIRP (International Commission on Non-Ionizing Radiation Protection). These guidelines have been developed following a thorough review of the science including both thermal and non-thermal effects. UK radio base station installations have been surveyed by independent bodies and found to be hundreds, and sometimes thousands, of times below these guidelines. When ICNIRP reviewed their guidelines in 2009 they concluded: "ICNIRP reconfirms the 1998 basic restrictions in the frequency range 100 kHz–300 GHz until further notice." [Source: ICNIRP statement on the "Guidelines for limiting exposure to time-varying electric, magnetic and electromagnetic fields (up to 300 GHz)"] (As above, these guidelines are currently being revised, with consultation having been*

Cont.../

KEIR STARMER QC, MP

Member of Parliament for Holborn & St Pancras

undertaken in July to October, 2018 and the results being collated at the moment.)

- *The Advisory Group on Non-ionising Radiation summarised that: "although a substantial amount of research has been conducted in this area, there is no convincing evidence that RF field exposure below guideline levels causes health effects in adults or children." [Health Effects from Radiofrequency Electromagnetic Fields – RCE 20, 2012].*

- *In addition, the report 'Recent Research on EMF and Health Risk – Tenth report from SSM's Scientific Council on Electromagnetic Fields, 2015' notes that: "new studies on adult and childhood cancer with improved exposure assessment do not indicate any health risks for the general public related to exposure from radiofrequency electromagnetic fields from far-field sources, such as base stations and radio and TV transmitters"*

Finally, Camden has also commissioned emissions surveys of existing telecommunications installations and has found that the levels of all types of RF transmissions found near to mobile phone base stations amount to less than 0.3% of the current permissible levels set by ICNIRP. We intend to continue monitoring the impact of telecommunications developments to ensure that deployments continue to meet existing and future legislation."

I hope that the detailed response from the council offers sets out the limited powers that it has in regulating base stations. However, I also hope that the reassurances within the reply about RF levels in Camden are of reassurance.

With kind regards.

Yours sincerely

KEIR STARMER QC MP

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B. Correspondence with Tulip Siddiq MP

Email from individual who will be referred to as L.

Dear Tulip Siddiq,

As my MP I would like to object this proposal (see attached).

I live in XXX.

It is the fact that the mast company wants to put in a rooftop near 3 schools YYY and the activity nursery attached to XYY itself.

This mast is proposed in a built up area with many residents affected.

I have been diagnosed with Electrical Hypersensitivity. In fact it is on my medical notes.

Can you assure me that this mobile mast will not harm me or others?

I fear that it will be detrimental to my health.

I shall object to it strongly and urge others to do so.

There has been a moratorium on 5G in places such as Totnes, Frome and Salisbury.

Brussels recently called a halt to its roll out until further research has been done.

We must have a moratorium on 5G in Camden.

I am considering taking legal action on Camden unless they can prove to me that 5G does not cause any harm to anyone.

I am attending a conference on Radiation Health on Saturday the 28th to obtain much more information.

The response from Tulip Siddiq's office is below:

Many thanks for your email raising your concerns about 5G - I am more than happy to share my thoughts with you on this subject and appreciate you getting in touch.

I believe it is vital that we listen to scientific evidence on this subject. I am aware however of the health debate which has surrounded the introduction of 5G in the UK and understand concerns regarding the installation of new infrastructure in our towns and cities.

Public Health England (PHE) have published advice on the health effects of 5G. PHE follows the guidelines of the International Commission on Non-Ionizing Radiation Protection (ICNIRP). According to PHE, 5G is within their radiofrequency guidelines and has concluded that there is 'no evidence of any adverse health effects below the restrictions in the guidelines'.

I understand your concern on this matter however and the Government must consider new evidence if and when it arises.

May I ask whether you have already been in touch with your local councillors? For cases of planning permission, it is often useful to contact them as they have responsibility for granting or rejecting applications. If you have already, I would be more than happy to make representations on your behalf.

Thank you again for getting in touch with me and highlighting this issue. Please feel free to contact me should you have any further issues.

Best wishes,

Office of Tulip Siddiq
Member of Parliament for Hampstead and Kilburn

SCHEDULE 10

MICHAEL BEVINGTON'S SUMMARY CRITIQUE OF ICNIRP GUIDELINES

MOBILE PHONES

High Frequency

Mr Bevington's critique is a criticism of the information contained in the ICNIRP article below:

https://www.icnirp.org/en/applications/mobile-phones/index.html

Mr Bevington's views:

HF effects on the body and health implications

HF fields have the ability to penetrate into the body (the higher the frequency, the lower the depth of penetration), with the effect of this being a temperature rise in body tissue.

Wrong: the effect of this is both a temperature rise in body tissue and numerous proven non-thermal effects.

The body can accommodate a small increase in heat, in a similar way that excess body heat is dissipated when performing sporting activity. This is because the human body has a strong ability to regulate its internal temperature. However, above a certain level (referred to as the threshold) depending on the duration of exposure, HF exposure and the accompanying temperature rise can provoke serious health effects, such as heatstroke and tissue damage (burns).

Acute and long-term effects of HF exposure from the use of mobile phones have been studied extensively without showing any conclusive evidence of adverse health effects.

Wrong: there a numerous long-term effects of HF exposure from the use of mobile phones which show conclusively without any doubt at all that HF can cause electrosensitivity symptoms and cancers.

Among all of this research, the risk of tumors in close proximity to the ear where the phone is held, e.g. brain tumors, has been the focus of numerous epidemiological studies. A few of these epidemiological studies have reported a slight increase in risk of some brain tumors for the small group of long-term and heavy mobile phone users (read more). These findings may be explained by reporting biases and weaknesses identified in the studies.

Wrong: These findings cannot all be explained by reporting biases and weaknesses but have been shown to be fully robust studies and convinced IARC in 2011 to classify RF as a 2B human carcinogen by a vote of 29 to 2. Since 2011 other studies have confirmed these findings.

Several studies have not reported any increase in brain tumors with mobile phone use.

[Not important: negative studies prove nothing. The fact that this sentence has been added indicates how weak the ICNIRP claims were.]

Also, experimental studies on animals and cells have failed to confirm the findings of the epidemiological studies,

Wrong – absolute rubbish and a deliberate lie. The animal NTP and Ramazzini studies both confirmed that RF causes cancer.

and there is no biophysical mechanism that could explain carcinogenicity at such low exposure levels.

Wrong: established and proven biophysical mechanisms include oxidative stress, free radicals, DNA breaks, VGCCs, gene expression etc.

In addition, the increased risk observed in some of the epidemiological studies is inconsistent with the stable frequency of occurrence of these tumors in the population.

Wrong: The Philips study showed significant increase in brain tumours. The ones which have not were skewed by design, such as the Australian one which omitted all cases over 60 years, which accounts for some 80% (I think) of such cancers.

That is an important consideration, given the widespread and significant increase in the use of mobile phones in the general population during the last few decades.

Wrong: it cannot be an important consideration since it is invalid.

A considerable amount of research has also been conducted on the relationship between HF fields and other outcomes such as headaches, concentration difficulty, sleep quality, cognitive function, cardiovascular effects, etc. To date, this research has not shown any such health effects.

Wrong: utter rubbish. There are hundreds if not thousands of studies confirming such effects.

The only consistently observed finding is a small effect on brain activity measured by electroencephalography (EEG).

Wrong: this is not the only effect – see above.

The biological implication of these small changes is, however, unclear.

Then why say so, apart from trying to dupe the reader? Most scientists see this effect as consistent with all the other neurological and cardiovascular effects.

For example, they have not been shown to affect sleep quality or be associated with any other adverse effects.

Wrong, as explained above. Sleep disturbance is one of the most established adverse effects, and usually comes top or in the top three effects of studies of residents close to base stations in comparison with people living further away.

The overall evaluation of all the research on HF fields as emitted by mobile phones leads to the conclusion that HF exposure below the thermal threshold is unlikely to be associated with adverse health effects.

Wrong: utter rubbish. It was known that RF causes adverse health effects in 1932 and nothing has proved this wrong subsequently but instead thousands of studies have confirmed that RF can cause many adverse effects.

See my Selected Studies for some references:
http://www.es-uk.info/wp-content/uploads/2018/05/Selected%20ES%20and%20EHS%20studies.pdf

Protection

To avoid health hazards from HF exposure emitted by mobile phones, the temperature rise in the body must be restricted.

Wrong, in that non-thermal effects must also be restricted. There is no evidence whatsoever from any scientist at all that the proven and established adverse effects from RF exposure can be generated by a temperature rise.

This can be achieved by limiting the absorption of HF energy, expressed in terms of the Specific Absorption Rate (SAR). In its guidelines ICNIRP recommends distinct SAR values applying to whole-body exposure, which is typical from base stations and for the head, and other locations in the body that are relevant for exposures from mobile phones.

ICNIRP follows up the HF related scientific research and any new information relevant to health.

Misleading: ICNIRP may follow up research but typically cherry-picks the, say, 20% of studies failing to find an effect but dismisses the 80% which find an effect.

A revision of the current ICNIRP guidelines on RF used as related to mobile phones is underway. **The public consultation of the draft guidelines is over. The comments are being analyzed and the draft guidelines continued. For timely information on publication, please register to the newsletter.**

Key point: the ICNIRP keeps to a single minority viewpoint, that the only adverse effect is heating and that this is short-term, against the majority viewpoint that there are proven numerous effects which are not overtly related to heat and can be cumulative, meaning that there are also long-term effects.

It was discovered in 1948 that RF causes cancer. In 1953 the US decided to follow Herman Schwan's mistaken and invalidated hypothesis that the only adverse effect is heating. In contrast the USSR and Poland accepted non-thermal effects by the time of their guidelines in 1959. Now up to half the world follows non-thermal guidelines and the rest (ie US, UK etc) follow ICNIRP's thermal short-term guidelines which the EU Parliament voted in 2009 were by then obsolete.

SCHEDULE 11

MICHAEL BEVINGTON'S DETAILED CRITIQUE

SERIOUS FLAWS IN THE WHO'S AND ICNIRP'S CLAIMS ON 5G AND RF WIRELESS RADIATION

The claims by the WHO and ICNIRP that 5G and RF wireless radiation are safe are seriously flawed and represent a minority viewpoint.

Instead, politicians, regulators and medical doctors should follow the majority viewpoint scientists.

A. The WHO and ICNIRP: minority and outdated thermal viewpoint

The self-appointed groups of the World Health Organization (WHO) and International Commission on Non-Ionizing Radiation Protection (ICNIRP) support an erroneous, invalidated and outdated heating hypothesis. They form a small cartel of people holding a minority scientific viewpoint which favours the wireless industry. Their rejection of the majority-scientific viewpoint has been described by the experts in this field as 'unscientific' and 'corruption'.

B. Majority viewpoint accepts non-thermal effects

In contrast the vast majority of the relevant expert scientists in eastern countries since the 1950s have accepted that the scientific evidence has long shown adverse effects from RF wireless radiation at non-thermal levels. This has also been the case for the vast majority of scientists in western countries since 2008. Thus the consensus among the majority of scientists is that RF wireless radiation at non-thermal levels has adverse effects which are not protected by WHO or ICNIRP's minority rejection of the scientific consensus.

The vast majority of scientists also accept, in addition to the proven adverse effects, the therapeutic uses of non-thermal wireless radiation now commonly applied in numerous hospital procedures, none of which can occur according to the WHO and ICNIRP minority who still reject non-thermal effects.

C. 2G, 3G and 4G already proved harmful

To suggest that 5G has been proved safe would be clearly against the vast majority of the scientific evidence on 2G, 3G and 4G radiation, which is the same as used for the current initial rollout of 5G.

D. No tests on 5G so far, so impossible to claim as safe

It is wrong to state that 5G is safe. There have been no tests on 5G's safety so far, although existing evidence already proves that its type of radiation is unsafe.

E. Millimetre waves known to be dangerous and used as weapons

Future 5G systems will use millimetre waves. Millimetre waves have been proved to be unsafe in many ways. They are also used as offensive weapons in electronic warfare and even in crowd control where they have not been banned on safety grounds.

F. The dangers of RF wireless radiation were described in 1932 with cancer shown in 1953

It has long been known that radio frequency (RF) wireless radiation is dangerous. The symptoms of low-level RF exposure, often described as specific symptoms of electrosensitivity, were first recorded in 1932, the year that such RF harm was also confirmed as non-thermal. Cancer was discovered as caused by RF wireless radiation in 1953. Safety guidelines were then adopted: in the USA in 1953 based on Schwan's mistaken heating hypothesis, and in the USSR in 1959 based on non-thermal effects. Now up to about half the world follows Russia with non-thermal guidelines, while the USA and the UK still follow Schwan's mistaken heating claim from 1953.

G. Cancer and genotoxic DNA damage confirmed in 2004 by EU study

In 1994 DNA damage from microwaves was shown within the current ICNIRP heating guidelines of 10,000,000 μW/m2, leading to a call for their replacement. In contrast current international non-thermal guidelines typically range from 0.1 to 100 μW/m2. This DNA damage was confirmed by the seven-nation REFLEX research study funded by the European Union in 2004. It showed that the health effects in the form of genotoxic DNA damage (micronuclei DNA strand breaks) are similar or greater for 24-hour exposure to an ordinary GSM 1800 MHz mobile phone at SAR 1.3 W/kg (i.e. within the UK safety limit of 2.0 W/kg and the FCC's of 1.6 W/kg), compared with 0.5 Gy gamma-rays or exposure to 60 CT scans. The findings of this government-backed study well illustrate that wireless radiation of the type already used and planned for 5G is unsafe.

H. International long-term non-thermal safety guidelines should be used, not ICNIRP's short-term (6 or 30 minutes average) obsolete guidelines

All forms of electromagnetic (EM) radiation can be unsafe. This is the reason why international safety groups and safety guidelines exist. (i) Long-term biological guidelines include: Bioinitiative 2012, EUROPAEM EMF Guidelines 2016, IGNIR 2018, and Seletun 2010. These international guidelines typically adopt values for public safety levels ranging from 0.1 to 100 μW/m2. These are up to 100 million times lower than ICNIRP's obsolete short-term heating guidelines.

(ii) ICNIRP's 1998 obsolete short-term heating guidelines still permit power density in the range of 10,000,000 μW/m2. This was based on Schwan's 100,000,000 μW/m2 of 1953, and was adopted in 1982 by ANSI C95.1-1982 for the heat absorbed by the body, and now set at 0.08 W/kg averaged over 0.1 hour (6 minutes) for the whole body, as the Specific Absorption Rate (SAR).

I. The World Health Organization's (WHO) online factsheet entitled "Electromagnetic fields and public health: mobile phones" is outdated, inaccurate and does not protect human health or wildlife. (i) It is out of date, since it was published in 2014 and states that it will be replaced by 2016 by the WHO's risk assessment, although this has not yet (September 2019) been published. (ii) It is factually incorrect in numerous aspects. (iii) It omits established confirmation of RF as a cause of electrosensitivity (ES) and cancer among many other proven

adverse outcomes. (iv) It confirms the published views by leading world experts in this field that the WHO is ‘unscientific’, that it does not protect health from the established harm of RF wireless radiation and 5G, and that its major conflicts of interest in its support for the wireless industry ‘seriously undermine’ its credibility *(see references at end)*. (v) It was not peer-reviewed.

(vi) It makes no reference to 5G.

J. The WHO lacks medical physicians experienced in diagnosing and treating real electrosensitivity

This WHO factsheet on mobile phones is a non-peer-reviewed opinion piece which does not give its author. It was probably approved by the leader of the WHO EMF Project who is a trained electrical engineer, not a medical physician with experience in diagnosing real electrical sensitivity (ES) as expected for assessing the established health risks from EM radiation. The WHO has shown itself unable to deal scientifically with these issues because (i) it is dependent on its parent body, the United Nations, with its predominant interests in trade and commercial development rather than health, (ii) it has been legally subservient in matters of radiation since 1959 to the IAEA (International Atomic Energy Authority) whose role is to exploit radiation as much as possible, (iii) it still adheres to Schwan’s 1953 mistaken heating hypothesis against the majority-viewpoint scientists,

(iv) and it lacks any of the majority-viewpoint scientific experts,

(vi) as explicitly addressed by The EMF Call of 2018, initiated by leading scientists in this area specifically to tackle this recognised problem, that the WHO is now regarded as ‘unscientific’ in its approach to the established dangers of RF wireless radiation including 5G, and that the WHO is now regarded as failing to provide guidelines which are protective of human health.

K. The UK government also lacks advice from majority-viewpoint scientists

The [UK] government claims (‘Mobile phone base stations: radio waves and health’, update May 16 2019) that it depends on its ‘independent expert groups’. This online document is also not peer-reviewed. It relies significantly on the invalidated AGNIR 2012 Report, which leading scientists have asserted should have been retracted long ago. (i) The invalidated AGNIR 2012 Report, like the WHO’s opinions, was also not peer-reviewed. (ii) It has been shown to be ‘unsafe’ in that it ignored up to 80% of studies showing adverse health effects and cherry-picked the few which failed to find an effect. (iii) It was a blatant example of conflict of interests, since it depended on contributions and views of the government’s own employees and thus was not an independent review. (iv) Its committee was composed of people holding a single and invalidated viewpoint based on Schwan’s heating mistake of 1953, all part of the minority-viewpoint cartel controlling PHE, AGNIR, SCENIHR, ICNIRP and the WHO EMF Project, all of which support the wireless radiation industry.

L. UK government’s very poor record on the proven harm from RF wireless radiation, and failing under the Health & Social Care Act 2012

The UK government has a very poor record on this issue of the established and proven harm from RF wireless radiation. (i) In the 2019 Westminster Hall debate MPs stated that they sought to help their constituents who were injured by the current high levels of EM exposure in

the UK. They complained that the UK government refused to acknowledge this issue and instead acted like a ‘brick wall’ when it came to accepting the science and mitigating RF harm.

(ii) The complaints to the PHSO by over 80 UK citizens seriously harmed by the failure of the government’s Public Health England (PHE) to acknowledge the established science on the dangers of RF wireless radiation began in 2013 but they have still to be resolved. The government wrongly believes it has the right to deny or ignore the majority-viewpoint scientific evidence and therefore PHE does not have to admit or even state, for instance, that EM exposure including RF wireless radiation and 5G is a 2B or 2A human carcinogen according to the WHO’s IARC. (iii) Denials of harm from the Department of Health and Social Care (DHSC) still refer to the notorious AGNIR 2012 report, even though this has been shown to be unscientific, unsafe, and the product of conflicts of interest, as explained above. (iv) The DHSC claims to review studies on health damage from EM exposures, but the DHSC’s COMARE also admits that it has its delegated responsibility for this to the unelected private minority-viewpoint group ICNIRP, part of the cartel supporting the wireless industry. (v) The DHSC has no means of engaging with the majority-viewpoint scientists in this area. In 2017 it abandoned its AGNIR committee, set up as a front in 1990 to reduce criticism of its unscientific approach. Its COMARE committee, a similar front to cover up the evidence of cancer clusters near reactors, decided in 2019 to abandon its plan to form a subcommittee on non-ionising radiation.

(vi) The DHSC and PHE believe that they can control RF wireless radiation through Health & Safety legislation under HSE and planning controls under NPPF, but neither is based on the proven non-thermal harm for RF radiation and thus they can never be protective of health.

(vii) Therefore the Secretary of State through the DHSC and PHE appears to be failing in his legal responsibility under the Health and Social Care Act 2012 (11.2A.3.a,b) for ‘the protection of the public from ionising and non-ionising radiation, a matter in which the HSE has a function’, since the cases of harm from 5G trials already being seen in the UK could not occur if this responsibility were being properly fulfilled.

M. The EU has a poor record on acting on the proven harm from RF wireless radiation

Nicole Scholz’s European Parliament Briefing “Mobile phones and health: Where do we stand?” of March 2019 was not peer-reviewed and should be rejected as scientific evidence. It is unscientific in several key ways. (i) It upholds SCENIHR 2015, despite this being part of the discredited minority-viewpoint cartel, as explained above. (ii) It still holds to the long-invalidated heating hypothesis based on Schwan’s 1953 mistake, and thus rejects the European Environment Agency’s Recommendation to adopt a Precautionary Approach. This Precautionary Approach would require a moratorium on 5G and more stringent safety guidelines for the general public, including pregnant women, children, the elderly, the sick, people sensitive to EM radiation and people with chronic immune conditions. A Precautionary Approach has legal status in the EU, but this Briefing adopts a contrary and thus apparently illegal approach. (iii) It fails to recognise the European Parliament’s vote of 2009 by 522 to 16 that governments should reject the WHO ICNIRP’s short-term heating guidelines as ‘obsolete’ and replace them with biological long-term guidelines. (iv) It fails to recognise the Council of Europe’s Parliamentary Assembly vote of 2011 calling on member states to recognise the urgent needs of people sensitised to EM exposures and create ‘white zones’ appropriate for them (see IGNIR’s EQZ). (v) The latest review of surveys estimates that 3.6% of the population (27 million people in Europe) are sensitised to EMFs and RF wireless radiation like

5G, and 1.2% (9 million) are severely affected. The scientifically proven and well established condition of all such people relates to the implementation of the Equality Act 2010 as regards 5G and other wireless radiation. (vi) The EU Briefing's concern for the safety of wireless radiation is valid given that the correct level of protection from man-made wireless radiation is essential to the future existence of human beings and wild-life in Europe, since 5G like other RF radiation has established teratogenic, toxigenic and fertility effects impacting the future of all life in Europe. Some leading experts predict a rise in autism to 50% of boys within decades if RF continues to grow exponentially, along with continued plummeting fertility and further wildlife loss.

N. The need to adopt the majority-viewpoint scientific position, not the minority one (i) The WHO, AGNIR and EU documents refer only to non-peer-reviewed invalidated claims by the minority-viewpoint cartel supporting the wireless industry. These comprise some 20-30 individuals, none of whom is a medical physician with experience in diagnosing and treating real sensitivity to RF radiation. (ii) In contrast, the majority viewpoint, accepting the established proof of ES and cancer as caused by RF wireless radiation and EM fields or their role as a co-carcinogen, is represented by some 240 involved scientists who have signed the International EMF Scientist Appeal. These are thus a majority over the industry cartel of some 240 to 30. (iii) Similarly some 200 involved scientist have signed the EU 5G Appeal to halt 5G, and the Stop 5G on Earth and in Space: International Appeal has over 150,000 signatures.

O. Proof exists of 5G harm but not proof of its supposed safety

(i) There is not a single peer-reviewed study proving that RF wireless radiation like 5G is safe. Nor can there be, since RF wireless radiation and thus 5G has long been established as harmful. (ii) In contrast, the majority-viewpoint scientists, accepting non-thermal adverse effects, can refer to thousands of peer-reviewed studies establishing their concerns (see, for instance, Selected Studies on ES and EHS). (iii) The WHO's IARC classified EM x-ray and gamma rays as a class 1 human carcinogen (1999), EM ELF as a class 2B human carcinogen (2001), EM visible blue light at night as a class 2A human carcinogen (2007), and EM RF wireless radiation as a class 2B human carcinogen (2011). (iv) The IARC's 2B human carcinogen classification was for non-thermal effects, since the increased brain tumours on which this was based were all from mobile phones which are designed so as not to heat the human body.

(v) The US $30 million National Toxicology Program study, requested by the FDA to see if cellphones cause cancer, found 'clear evidence' (its top rating) that they do cause cancer. This study, together with the Ramazzani study confirming its findings and showing clear evidence of cancer from exposures similar to mobile phone masts, provides 'sufficient animal evidence', together with known mechanisms like VGCCs, oxidative stress, gene expression, DNA damage perhaps through repair restriction, free radicals etc, to already meet the requirements of IARC's class 1 certain human carcinogen for RF and 5G wireless radiation exposures, according to the majority of scientists. Thus these studies require that RF should be reclassified as a class 1.

(vi) This would mean that the issue of RF wireless radiation and 5G safety has already been answered in such a way that governments urgently have to reduce RF exposure to safe levels.

(vii) In the light of the NTP and Ramazzini studies finding ‘clear evidence’ of cancer, the IARC now regards the reassessment of RF wireless radiation as a high priority.

(vii) As noted above, the WHO and UK government are far behind in advising citizens of the established science on the dangers of 5G and similar RF wireless radiation. In the UK more authoritative and up-to-date sources of relevant, reliable, majority-viewpoint evidence include: ES-UK, IGNIR, PHIRE, Powerwatch, SSITA, Radiation Research Trust, Wifiinschools etc. (viiii) There are hundreds of internet sites, most giving much more accurate and up-to-date scientific information than is available from the WHO’s outdated, inaccurate and misleading opinions, dated 2014 on mobile phones and 2005 on EHS. See e.g. Electrosensitivity.co: Links.

P. 5G, military warfare and military protection for civilians who can afford it

(i) Millimetre waves, planned for 5G, are already in widespread use for military warfare and in some civilian crowd control. This confirms that this type of 5G radiation can cause adverse reactions in the ordinary population and especially those sensitive to it, something which even the wireless industry cannot deny.

(ii) The beam-forming properties of 5G are an especial concern when these combine in intersecting beams or are directed into super-sensitive biological organs such as the eyes.

(iii) The location of 5G transmitters on lamp-posts outside bedroom windows where people sleep is also a major concern, both for down- and up-streaming. (iv) Many people who have been sensitised to RF wireless radiation have to use the same protective netting and materials developed by the military for protecting their own troops from electromagnetic assault. People in the UK today are living in tents or cars in remote areas to escape the harm caused by EMFs and RF wireless radiation like 5G because they cannot afford this costly protective shielding or the relocation of their homes to areas less intensely irradiated.

(v) The number of people harmed by EMFs and RF wireless radiation appears to be constantly growing, with contacts to the charity Electrosensitivity UK increasing by 10% per year for over a decade. Some reports of bioeffects to both humans and wildlife during initial 5G trials including within the UK suggest that 5G has the capacity to be significantly more damaging to life than even 3G and 4G.

Q. Illegality of 5G and similar RF wireless radiation when deployed against people without safety testing and without their informed consent

The legality of 5G and similar RF wireless radiation is under growing scrutiny now that effects such as sensitivity to EM exposure and cancer have been proven in numerous scientific studies and are accepted by the majority-viewpoint scientists. (i) The unsafe nature of RF wireless radiation for 3G and 4G and such as used in the initial 5G roll-out has been recognised in UK courts since 2012 and sensitivity to it has been diagnosed by some NHS GPs and hospital consultants since 2013. (ii) The first legal cases against 5G deployment have succeeded in countries like Australia in 2018-19, and many others are planned there and worldwide. (iii) There is concern that the lack of prior safety testing and the lack of informed consent for the in situ health testing of the novel phased-array and beam-forming features of 5G mean that its deployment contravenes the Nuremberg Code. (iv) Some countries have banned 5G because of its lack of proven safety, as have some towns in the UK.

(v) The UK government admits that environmental radiation levels are likely to increase with the introduction of 5G.

(v) Although members of the minority-viewpoint cartel supporting the wireless industry, as explained above, prefer to make generalised assumptions implying the safety of 5G and similar RF wireless radiation, while also calling for more research, most refuse to state that it is safe. Thus the UK government has been very careful to admit uncertainty by stating that there is no proof that 5G or similar RF wireless radiation is safe, only that they have failed to find 'consistent' or 'convincing' evidence of harm. These latter two terms are unsatisfactory both as not being scientifically explicit, and in contradicting the established science which has proved that effects of RF wireless radiation include sensitivity symptoms and cancers.

R. Latest scientific evidence on human beings and wildlife: moratorium on 5G required

The growing interest in the safety of 5G and similar RF wireless radiation led to two major scientific international conferences in London in September 2019, where experts from America and Europe explained the latest science and research.

(i) This showed convincingly and consistently, based on established and proven scientific evidence, that RF wireless radiation is a serious threat to all human beings and also the natural living world. (ii) In contrast, it appears that the WHO, ICNIRP and most governments have not yet conducted effective Environmental Risk Assessments before infrastructure projects like 3G, 4G or 5G, since there are now hundreds of studies showing harm to wildlife from RF wireless radiation. The exception is the EU Environmental Protection Agency which has called for the Precautionary Principle (PP) to be applied, meaning a moratorium on further developments such as 5G since the PP is enshrined in EU legislation.

(iii) Studies show that near phone masts insect wildlife can cease to reproduce within five generations. During the last decade insect numbers have declined by 70-80% in the UK and it has been confirmed that bees especially are affected by RF wireless radiation.

S. Equal access and protection for children and adults harmed by RF wireless radiation

The UK Government is aware of people for whom 5G is not safe and who are sensitive to RF wireless radiation, since UK courts have recognised the condition since 2012 and the UK government states that it follows the WHO and ICNIRP. (i) In 2002 the ICNIRP stated that governments must protect such people by adopting non-thermal safety guidelines below its own short-term and heating guidelines. The fact that the UK Government has not yet implemented the ICNIRP's requirement in this respect shows that the safety of 5G, like that of 3G and 4G, remains a very big issue among the many people affected by this radiation in the UK. (ii) The UK government rejected making wireless smart meters compulsory partly on health safety grounds on November 29 2011. (iii) The NHS endorses the chief medical officers' warning that children under 16 should not use mobile phones except for essential purposes. Children absorb ten times more RF radiation in their bones than adults. Since wireless radiation has cumulative effects, children are especially vulnerable when faced with lifetime exposures. Some countries warn women not to use mobile phones during pregnancy and near babies.

(iv) UK first tier tribunals have accepted since 2012 that children and adults can have real EHS and thus are unable in severe cases to attend schools and workplaces with Wifi and mobile phones. Tribunals have compensated adults with ESA, PIPs, early retirement, etc.

(v) A UK government-sponsored survey found that 4.0% (2,680,000 people in the UK) are sensitive to RF wireless radiation and EM fields, and 1.8% (1,206,000) are severely affected, while another survey estimated 0.65% (435,000) are denied full access to work or education because of their sensitivity to EMFs and RF wireless radiation, like 5G. (vi) The WHO in 2005 confirmed that the symptoms of electromagnetic hypersensitivity (EHS) can be disabling, putting EHS within the scope of the Equality Act 2010. Since 2005, when the WHO made its most recent non-peer-reviewed comments on EHS, real pathological EHS has been confirmed by many more studies as proven, following its discovery in 1932, and as caused by EM exposure. Its identification as an environmental intolerance is now possible through objective markers including 3d fMRI scans, cerebral blood perfusion scans, and testing for genetic haplotypes up to ten times more common in people with this environmental intolerance.

T. The need to ban or limit RF wireless radiation, implement EM hygienic campaigns, and warn citizens

Other countries have

(i) banned Wifi and mobile phones in schools for safety reasons, such as France,

(ii) launched EM hygienic campaigns, such as Berkeley CA, Cyprus and Italy,

(iii) rejected ICNIRP's short-term heating guidelines, such as China, India, the USSR and some European states, covering a third to half the world's population.

The safety of 5G is a rapidly growing issue, with the BBC apparently repeating a report warning about 5G dangers four times on a single day in June 2019 and the UK media reporting recently that thousands in Switzerland demonstrated against 5G dangers.

V. Phonegate: the need to check the safety of mobile phones and to warn the public

5G's established and proven lack of safety, together with the wireless industry's denials and refusal to accept the majority established scientific evidence, is corroborated by the Phonegate scandal, similar to the Dieselgate or Emissionsgate scandal. (i) This Phonegate scandal concerns the sale of mobile phones with actual radiation emissions exceeding levels reported in their accompanying documentation. This apparent deception means that some mobile phones fail to comply with even ICNIRP's 1998 short-term heating guidelines, let alone international long-term biological guidelines. (ii) ANFR's testing in France in 2015 found that 90% of mobiles tested exceeded ICNIRP's guidelines when used next to the body. Some models were subsequently withdrawn from sale. (iii) In the USA testing by the Chicago Tribune in 2019 also found radiation levels allegedly exceeding FCC guidelines, leading to an investigation by the FCC and class action lawsuits against Apple and Samsung. (iv) It is not clear why similar models of mobile phones on sale in the UK do not yet seem to have been subjected to investigation and action by trading standards officers or PHE. Nor is it clear why the public has not been warned by trading standards or PHE of the danger that, if they have purchased abroad a mobile implicated in the Phonegate scandal, their mobile may be emitting excessive radiation.

(v) 5G phones will apparently be likely to contravene not only long-term biological safety guidelines but even existing ICNIRP short-term heating guidelines, unless these latter guidelines are relaxed, or attempts made to adapt the phones so that they stop transmitting if

the antenna is held too close to the body. This means that it is vital that the radiation levels of 5G mobile phones should be investigated carefully and impartially if users are to be kept safe.

Franz Adlkofer: "How the Mobile Communication Industry Deals with Science as Illustrated by ICNIRP versus NTP" (Pandora Foundation, October 26 2018) Claire Edwards: "BBC Fake News on 5G Decoded: Health Impacts Denied Despite Overwhelming Scientific Evidence" (Global Research, August 25 2019)

Investigate Europe: "The 5G mass experiment: Big promises, unknown risks" (January 13 2019)

Investigate Europe: "How much is safe? Radiation authorities rely on controversial group for safety advice" (March 14 2019)

Jerry Flynn: "Champions of the “Thermal Effects Only” Dogma For EMFs" (2019)

Hardell L: “World Health Organization, radiofrequency radiation and health – a hard nut to crack (Review)” (Int J Oncology, 2017)

Lennart Hardell: "ICNIRP draft on new radiofrequency guidelines is flawed" (June 25 2019)

Simon Hodges: "How ICNIRP, AGNIR, PHE and a 30 year old political decision created and then covered up a global public health scandal" (Community Operating System, September 12 2019)

Antoinette Janssen: "ICNIRP guidelines are fraudulent" (Mutterland, July 30 2019)

Antoinette Janssen: "ICNIRP" (Mutterland, June 2 2019)

JRS eco wireless: "Problems with official ICNIRP exposure limits for electromagnetic radiation" (2019)

Dariusz Leszczynski: "ICNIRP’s public consultation of the draft of the RF guidelines is just a gimmick" (BRHP, July 25 2019)

Miller AB et al.: “Risks to Health and Well-Being From Radio-Frequency Radiation Emitted by Cell Phones and Other Wireless Devices” (Front Public Health, 2019)

Joel M. Moskowitz: "ICNIRP's Revised RF Exposure Limits Will Ignore Expert Opinions of Most EMF Scientists" (Saferemr, June 26 2019)

Pall ML: “Scientific evidence contradicts findings and assumptions of Canadian Safety Panel 6: microwaves act through voltage-gated calcium channel activation to induce biological impacts at non-thermal levels, supporting a paradigm shift for microwave/lower frequency electromagnetic field action” (Rev Environ Health, 2015)

Martin Pall: “5G: Great risk for EU, U.S. and International Health! Compelling Evidence for Eight Distinct Types of Great Harm Caused by Electromagnetic Field (EMF) Exposures and the Mechanism that Causes Them” (2019, 90 pages)

Martin Pall: “Eight Repeatedly Documented Findings Each Show that EMF Safety Guidelines Do Not Predict Biological Effects and Are, Therefore Fraudulent: The Consequences for Both Microwave Frequency Exposures and Also 5G” (Second Edition, May 23 2019. 28 pages)

Martin Pall: “Twelve Questions” (2019)

Redmayne M: “International policy and advisory response regarding children's exposure to radio frequency electromagnetic fields (RF-EMF)” (Electromagn Biol Med., 2015)

Sage C et al.: “Comments on SCENIHR: Opinion on potential health effects of exposure to electromagnetic fields, Bioelectromagnetics 36:480-484 (2015)” (Bioelectromagnetics, 2015)

Olga Sheean: “World Health Organization: Setting the Standard for a World of Harm” (2017)

Louis Slesin: “WHO Watch: Mike Repacholi and the EMF Charade” (Microwave News, 2005)

Starkey SJ: “Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation” (Rev Environ Health, 2016)

Webster PC: “Federal Wi-Fi safety report is deeply flawed, say experts” (CMAJ, 2014)

Michael Bevington

October 2 2019

SCHEDULE 11A - Various reports in 2020 guidelines and critiques and/or comments

There are a few reports and their critiques below. They appear in the order shown in the 2020 guidelines.

a) ICNIRP 1998 guidelines

There are many critiques of these guidelines. One is by Dr Neil Cherry.

Summary of Critique against best research practices:

- Seriously flawed and unlawful
- Makes little use of epidemiological data
- Wrong claims and conclusions

Dr Neil Cherry of Lincoln University set out his Criticism of the Proposal to adopt the ICNIRP guidelines for cellsites in New Zealand in a paper dated 10/2/99

He makes the charges above. In particular regarding the “Epidemology of Cancer” he states the following about the 1998 guidelines:

b) Lerchl A, Klose M, Grote K, Wilhelm AF, Spathmann O, Fieldler T, Streckert J, Hansen V, Clemens M

This paper does show harm to humans. Yet the guidelines state there is no harm to humans.

This is what is said about that paper:

On the same day that the EC's SCENIHR released their long-awaited report [1] that concluded that we should not worry about any adverse health effects of EMF/RF fields, a new well conducted replication study [2] shows that long-term 3G/UMTS microwave exposure can act as a co-carcinogen and statistically significantly increase cancer growth at very low exposure levels, 50-fold below currently permitted levels.

Everyone using a 3G mobile phone or iPad or other tablet will be exposed at higher levels than this (0.04 W/kg). This study flags a big and important "wake up alarm call".

These are levels that many, if not most, of our children are now being being exposed to WiFi at school, when using laptops and tablet PCs. Modern WiFi signals use RF modulation schemes that are similar to UMTS. It is vital that this study is repeated using similar exposure levels with various types and frequencies of WiFi.

In our opinion this is a crucial replication study that provides confirmation in a well-conducted *in-vivo* animal study that modulated microwave RF exposure can act as a co-carcinogen. This should be adequate to change its IARC 2B rating (possible human carcinogen) into the 2A category (probable human carcinogen).

The team was led by Professor Dr Alexander Lerchl and funded by a grant from the German Federal Office for Radiation Protection (BfS), Salzgitter, Germany. The funding agency

defined the principal study design which was further developed with Dr Lerchl. The authors declare no conflicts of interest. In the past Dr Lerchl has been outspoken in his belief that current science had shown that low levels of microwave RF exposure could not be carcinogenic, so publication of this new, well conducted, study that shows the opposite is to his credit.

We call on the EC to issue a warning to the general public, and especially schools, and to urgently authorise funding for repeating this work using exposures to the the various WiFi modulation standards as soon as possible. As a UK-based group, we also call on the UK Department of Health to revise their Public Health England organisation's website advice that currently supports schools in their use of WiFi for children of all ages. Powerwatch has long believed that this is unethical and we have repeatedly called for WiFi exposure related health research which, to our knowledge, has not been done by any official organisation.

The authors write:

"Previously published results from a pilot study with carcinogen-treated mice, however, suggested tumor-promoting effects of RF-EMF (Tillmann et al, 2010). We have performed a replication study using higher numbers of animals per group and including two additional exposure levels (0 (sham), 0.04, 0.4 and 2 W/kg SAR)... Numbers of tumors of the lungs and livers in exposed animals were significantly higher than in sham-exposed controls. In addition, lymphomas were also found to be significantly elevated by exposure. A clear dose-response effect is absent. We hypothesize that these tumor promoting effects may be caused by metabolic changes due to exposure."

"Our study confirms and extends the previously published observations of tumor-promoting effects of life-long RF-EMF exposure... Since many of the tumor-promoting effects in our study were seen at low to moderate exposure levels (0.04 and 0.4 W/kg SAR), thus well below exposure limits for the users of mobile phones."

"The fact that both studies found basically the same tumor-promoting effects at levels below the accepted (and in most countries legally defined) exposure limits for humans is worrying. Although animal experiments are generally not easily transferable to the situation in humans, the findings are a very clear indication that - in principal - tumor-promoting effects of life-long RF-EMF exposure may occur at levels supposedly too low to cause thermal effects."

Some more details of the study:

In 2010, Tillmann and colleagues published a study [3] showing tumour-promoting effects of life-long exposure to microwave RF from 3G (UMTS) at moderate exposure levels in mice treated with a carcinogen while *in-utero*. Those results were potentially influenced by an unexpected infection. Their data showed clear effects of RF-EMF exposure on the incidences of lung and liver tumours. The exposed mice also had double the number of metastasising lung tumours compared with the non-exposed mice. SCENIHR 2015 does mention the Tillmann, et al, study on page 85 and say that a further study "might be informative", but also state that peak exposures were high (5 W/kg), implying that there might be some thermal effect.

Lerchl's team have replicated this study with higher numbers of mice per group in order to clarify whether the previously reported results could be confirmed. In addition, two additional

SAR levels of exposure (low and high) were included in this well designed new study in order to investigate possible dose-response relationships.

What they have found are co-carcinogenic promotional effects at all levels of UMTS RF/microwave exposure. In fact, the lowest level of exposure shows the highest, statistically significant, promotional effect. Please see the Figure (above) reproduced from the paper.

The paper is available from the journal's website, linked below.

We call on the German BfS to fund the Open Access publication of this paper. Most modern Public (tax) and Charity funded research now has a stipulated requirement for the results to be published as an Open Access (freely downloadable) paper and a sum is given in the grant to allow for this. This only involves the funders paying a few thousand euros (or USD) to the publishers, which is a small sum compared with the cost of the actual research.

References

1/. » The 2015 SCENIHR Opinion *(PDF download)*

2/. » A. Lerchl, M. Klose, K. Grote, A.F.X. Wilhelm, O. Spathmann, T. Fiedler, J.Streckert, V. Hansen, M. Clemens, Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans, Biochemical and Biophysical Research Communications (2015), doi: 10.1016/j.bbrc.2015.02.151

3/. » T. Tillmann, H. Ernst, J. Streckert, et al., Indication of cocarcinogenic potential of chronic UMTS-modulated radiofrequency exposure in an ethylnitrosourea mouse model, Int. J. Radiat. Biol. 86 (2010)

This page was last updated at 06:48 GMT on 8 March 2015

c) National Toxicology Programme

The 2020 guideline mentions this US$30m study but dismisses it. This paper addresses ICNIRP's criticism of this paper.

https://journals.lww.com/health-physics/Citation/2020/06000/Regarding_ICNIRP_S_Evaluation_of_the_National.11.aspx

d)

e) Brain and Salivary Gland Tumors and Mobile Phone Use: Evaluating the Evidence from Various Epidemiological Study Designs

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Abstract

Mobile phones (MPs) are the most relevant source of radiofrequency electromagnetic field (RF-EMF) exposure to the brain and the salivary gland. Whether this exposure implies a cancer risk has been addressed in several case-control and few cohort studies. A meta-analysis of these studies does not show increased risks for meningioma, pituitary, and salivary gland tumors. For glioma and acoustic neuroma, the results are heterogeneous, with few case-control studies reporting substantially increased risks. However, these elevated risks are not coherent with observed incidence time trends, which are considered informative for this specific topic owing to the steep increase in MP use, the availability of virtually complete cancer registry data from many countries, and the limited number of known competing environmental risk factors. In conclusion, epidemiological studies do not suggest increased brain or salivary gland tumor risk with MP use, although some uncertainty remains regarding long latency periods (>15 years), rare brain tumor subtypes, and MP usage during childhood.

Summary of Critique against best research practices:

- Bias and lack of independence - “The paper is the most biased review of this topic that I have [ever] read,” Moskowitz replied. He urged Jerrett not to publish it, telling him that doing so would be a “disservice to public health.”
- Conflict of interest
- Does not take account of pre-existing research
- Problems with peer review – Moskowitz, an Epidemiologist explained (:https://microwavenews.com/short-takes-archive/row-over-review)

  “In my opinion, this meta-analysis and review paper does not reflect the state of the science. Furthermore, publication of the paper in this form would contribute to industry efforts to manufacture doubt about cell phone radiation risks and impair public health harm reduction efforts.”

Röösli et al. (2019) Annual Reviews article (information papers: March)

The work of some of our contemporaries either side of the pond, e.g. Drs Louis Slesin and Joel Moskowitz stateside, and Professor Denis Henshaw, Alasdair Philips, et al. closer to home, raises a number of important questions about such publications. These issues relate,

ultimately, to (uncorrected) evidence of selective misrepresentation (https://microwavenews.com/news-center/precarious-case-against-precaution) and improper peer-review (https://microwavenews.com/short-takes-archive/row-over-review), i.e. manifest bias and perversion of science. Slesin also highlights the following pertinent associations:

• The lead author, Dr Martin Röösli, is a member of ICNIRP and one of his co-authors, Professor Maria Feychting, is Vice Chair, and also had a hand in the 2012 AGNIR report: which our group, among others, has identified as being flawed and unreliable in a number of important respects (Letter of Concern: Anthropogenic EMFs, p. 7).

• Another of the co-authors, Dr Minouk Schoemaker, works with/under Professor Anthony Swerdlow: former Chair of AGNIR and lead author of the controversial AGNIR report.

• Each of Röösli's co-authors worked on the IARC's INTERPHONE project and were part of the minority faction that stubbornly maintained the results do not show a link between RF NIR and cancer. This view flies in the face of the data and was not accepted by the IARC; hence, the WHO's Category 2B Human Carcinogen classification of 2011.

• There was talk of this group putting a minority report together around that time but this never materialised. The Annual Reviews paper would appear to fill that gap; although it is perhaps a little late now, being as a growing chorus of concerned scientists, medics, and other specialists are calling on the IARC to upgrade the RF NIR classification – in light of the not inconsiderable (further) confirmatory study data to have accumulated over the past decade.

f) SCENIHR 2015 opinion paper - Rejects links between RFR and damage to humans.

Summary of Critique against best research practices:

- Scientific misconduct and fraud
- Bias and lack of independence
- Lack of sufficient expertise in chosen scientists
- Conflict of interest – massive as many members funded from industry
- Does not take account of pre-existing research
- EU failed to meet its own principles of "excellence, independence and impartiality, and transparency" https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:241:0021:0030:EN:PDF which relates to a Commission Decision as below:

COMMISSION DECISION of 5 August 2008 setting up an advisory structure of Scientific Committees and experts in the field of consumer safety, public health and the environment and repealing Decision 2004/210/EC

Preamble (7) states:

(7) The scientific advice on matters relating to consumer safety, public health and the environment must be based on the principles of excellence, independence and impartiality, and transparency, as developed in the Commission Communication on 'The collection and use of expertise by the Commission: principles and guidelines.

Improving the knowledge for better policies' (5), and it must be organised in conformity with best practice principles of risk assessment.

Criticism which can be found at the link below is reproduced here in full:

Complaint to the European Commission concerning the 2015 SCENIHR opinion on potential health effects of exposure to electromagnetic fields.

https://www.iemfa.org/wp-content/pdf/Complaint-to-the-European-Commission-SCENIHR-2015-08-31.pdf

This criticism is presented dated August 31, 2015 in a paper to the EU by a number of NGOs which are listed below:

Swedish Radiation Protection Foundation, Sweden, www.stralskyddsstiftelsen.se

Priartem, France, www.priartem.fr

Folkets Strålevern, Norway, www.folkets-stralevern.no

StopUMTS, The Netherlands, www.stopumts.nl

Electrosensibles por el Derecho a la Salud (EDS), Spain, electrosensiblesderechosalud.org/

Plataforma Estatal Contra La Contaminacion ElectroMagnetica (PECCEM), Spain www.peccem.org

Radiation Research Trust, United Kingdom, www.radiationresearch.org

Mast-Victims, United Kingdom, www.mast-victims.org

Electrosensitives in Finland, Finland, www.sahkoherkat.fi

The Swedish Association for the Electrohypersensitive, Sweden, www.eloverkanslig.org

Beperk de Straling, Belgium, beperk.de.straling@gmail.com ReteNoelettrosmog, Italia, www.retenoelettrosmogitalia.it

Associazione Medici per l'Ambiente – ISDE, Italy, www.isde.it

A.M.I.C.A, Association for Chronic Toxic and Environmental Injury, Italy, www.infoamica.it

The Irish Doctors Environmental Association (IDEA), Ireland, www.ideaireland.org

The Danish EHS Association - For Electromagnetic Hypersensitives, Denmark, www.ehsf.dk/ehs-foreningen.htm.

The CAVI Society, United Kingdom, www.cavisoc.org.uk/

Safe Schools Information Technology Alliance, United Kingdom, www.ssita.org.uk

Ärztinnen und Ärtze für eine gesunde Umwelt, Austria, www.aegu.net

Electrosensitivity UK (ES-UK), United Kingdom, www.es-uk.info

The paper now follows:

The European Commission has once again failed in setting up an expert group on the health effects of exposure to electromagnetic fields that meets its own principles of “of excellence, independence and impartiality, and transparency” (COMMISSION DECISION of 5 August 2008 (see above)).

The 2015 report ‘Opinion on potential health effects of exposure to electromagnetic fields SCENIHR’ is written by an unbalanced expert group and most of them are not free from influences and ties to the industries that have huge economic interests in the outcome of such opinions (annex 1). The experts behind the report blatantly fail in their main mission: to identify “potential health risks”.

There is evidence that clearly, convincingly and increasingly establishes that there are many potential negative health effects and health hazards: brain tumours, cancer, neurodegenerative diseases, damage on fetuses and stress related diseases, as communicated to the Commission by the Bioinitiative group

(http://www.bioinitiative.org/submission-of-comments-on-final-scenihr-opinion-from-the-bioinitiativeworking-group/).

The SCENIHR report ignores the scientific evidence of health risks from levels of exposure to electromagnetic fields that practically everybody is increasingly exposed to, including small children, in most countries in Europe today.

They also present studies in a manipulative way which we expose in annex 2 in a critical analysis of the section on brain tumour risks from mobile phone use. This rather limited group of experts who wrote the SCENIHR report had previously clearly expressed their negative attitude to possible health effects from EMF – in well known contrast to the opinion of a large and increasing number of the scientific expertise of the EMF scientific arena.

As an example, in May 2015 195 international EMF scientists sent an appeal to the United Nations, the WHO and it’s member states calling for better protection for the public from known health risks, more stringent standards and broader information to the public. No representative from this side of the scientific community was represented in the SCENIHR report.

Many of these 195 scientists are well respected, with decades of experience from the EMF health effects research. We call for a new balanced assessment that better meets the Commissions own principles. A new balanced and objective report, without the influence from industry biased experts, is urgently needed if the Commission does not want to continue to put Public Health at serious risk by policies based on incomplete, severely biased and false information.

The SCENIHR report, as it stands, is a disservice and a threat to the health and well-being of the people of Europe.

1. The lack of excellence, impartiality/independence and balance

The new SCENIHR expert group was from the start not prone to submit an objective presentation of the available scientific knowledge. It was, by its composition, largely biased towards a pro-industrial outcome. According to COMMISSION DECISION 2008, article 15, the experts “shall undertake to act independently of any external influence”. Therefore they “shall make a declaration of commitment to act in the public interest and a declaration of interests indicating either the absence or existence of any direct or indirect interest which might be considered prejudicial to their independence.”

In spite of repeated criticism about the unbalanced composition and biased reports from previous SCENIHR opinions (2007, 2009) and at the SCENIHR conference 2011 (annex 3), the new SCENIHR 2015 report is made by a group of individuals, that actually wrote the report and its conclusions, who practically all have known ties to industry (annex 1).

We have not yet received a valid explanation from the Commission for the exclusion of the important and well known section of the EMF scientific expertise that are of the opinion that there is clear and growing evidence of many potential negative health effects, including life threatening diseases. Instead the Commission has, for over a decade, favored an industry friendly, one sided expertise.

The Scientific Committee

There are two SCENIHR expert groups that are responsible for the SCENIHR EMF 2015 report: The Scientific Committee that accepted the report and the conclusions made by a second group, The Working Group.

The Scientific Committee is made up of 14 experts, but only two are experts on EMF, Theodoros Samaras and Norbert Leitgeb. Neither Mr. Samaras nor Mr. Leitgeb are health experts, they are technical oriented experts (physics, engineering). Mr. Samaras and Mr. Leitgeb therefore must have had the most influence over the eventual discussions about the proposed report and conclusions from the Working group.

The other 12 members Committee are not experts on health effects from EMF and have had no possibility to judge what is right from what is wrong in the report. This is a lack of excellence on potential health effects from EMF in the scientific committee.

It seems crucial that these two most influential experts in the committee that adopted the SCENIHR report from the Working group, Mr. Theodoros Samaras and Mr. Leitgeb meet the principles set out by the Commission “of excellence, independence and impartiality, and transparence”. Particularly when dealing with health effects where there are well known huge economic interests at stake, in this case from the telecommunications, IT and electric power industry.

However both Mr. Samaras and Mr. Leitgeb have ties to industry and organizations with a pro-industry attitude to health effects. They have repeatedly taken the industry friendly position that there are no health risks (intellectual bias). Both Mr. Samaras and Mr. Leitgeb are at present or have been members of standard setting organizations Theodoros Samaras in IEEE and Norbert Leitgeb in ICNIRP.

The organizations are well known to act in favor of industry interests and are long time deniers of possible health effects below their own standards to which the industry has adopted its products and technology: The standards from IEEE and ICNIRP are supported by industry and IEEE is dominated by industry representatives.

Mr Theodoros Samaras declared that he is an ex-consultant for Vodafone, a major telecommunications company. He failed to declare that he is also advisor to and former employee of IT'IS, according to documents from IT'IS (http://www.itis.ethz.ch/assets/Downloads/Annual-Reports/ITISReport2014web.pdf and 3 http://www.itis.ethz.ch/who-we-are/).

Mr. Samaras is "a long-term friend and colleague of the IT'IS foundation".

(http://www.itis.ethz.ch/news-events/news/awards/award-for-best-scientific-paper-presented-by-a-student-atbioem2013/)

IT'IS is an organization funded by the major telecommunication companies

(http://www.itis.ethz.ch/who-we-are/partners/).

Mr Norbert Leitgeb has, for over a decade, clearly declared his opposition to potential health effects from mobile phone radiation, for instance base stations. He claimed in 2003 that studies on health effects from base stations was a waste of time and money

(http://microwavenews.com/news/backissues/m-j03issue.pdf) and that there was "a greater need to reassure the public". (http://microwavenews.com/news/backissues/n-d02issue.pdf)

These examples expose inacceptable lack of independence and impartiality for the most influential persons In the Committee and particularly for the most influential expert behind the report, Mr. Samaras, both chairman of the Working group and member of the Committee.

The Working Group

The expert group actually wrote the SCENIHR report and made its conclusions, called the Working group or the External experts. This group is made up of 12 experts including its chairman, Theodoros Samaras. The majority of the working group's members also fail to meet the principles of independence and impartiality as evidenced by our review in annex 1.

All members have for years claimed that there are no health effects below existing guidelines, in line with industry interests. The only exception is Mr. Mild's opinion regarding brain tumour risks from mobile and cordless phone use – but his opinion has not been declared in the report nor documented as a minority opinion. Most of them, but not all, have also received funding from industry, directly or indirectly.

Several of them, like Mr. Leitgeb in the Committee, are members of or experts to ICNIRP (Mr. Mattsson, Mr. Sienkiewicz, Mr. Auvinen and Mrs. Scarfi). Mats-Olov Mattsson, former chairman of SCENIHR 2009, and present member of ICNIRP, is advisor to TeliaSonera, the major telecommunications operator in Sweden and Finland. Mr. Mattsson claims he is an unpaid advisor to TeliaSonera. This is difficult to believe in view of the company's annual net income of 15,599 million SEK and taking into account the fact that Mr. Mild , who is also an advisor to TeliaSonera, is paid for the same service.

Mr. Mattsson is employed by AIT in Austria which is 49,5% owned by the Austrian Federation of Industries, a conflict of interest that Mr. Mattsson failed to declare in his declaration of interests. (Mr. Mattsson only mentioned ownership by the Austrian state (50,5%).) AIT is intensively involved in wireless and energy solutions and has an objective of being a “major partner for private and public sector businesses”.
(http://www.ait.ac.at/fileadmin/cmc/downloads/Berichte/GBs/AIT_2013_Annual_Financial_Statement.pdf)

His employment at AIT therefore constitutes a clear conflict of interest. In addition there are more noteworthy conflicts of interest in the SCENHIR EMF expert group. Kjell Hansson-Mild, advisor to Telia Sonera. (In contrast to Mr Mattsson, Mr Mild does not claim he is unpaid for his advice)

Zenon Sienkiewicz, ICNIRP, member of management and funding from industry funded research program (MTHR). Advisor Japan EMF Information Center emanating from Japan Electrical Safety & Environment Technology Laboratories and the Japan Electric Association): holds shares in British Telecom

Anssi Auvinen, member ICNIRP and repeatedly funded by MMF, the Mobile Manufacturers’ Forum3 ;

Olga Zeni, previous funding from Telecom Italia and CTIA, Italy (wireless industry);

Maria Rosaria Scarfi consulting expert ICNIRP funding from industry (Telecom Italia and CTIA -wireless industry). Member of Cost BM0704 for which IT’IS is grant holder. Member of Italian Electrotechnical Committee on EMF (an Italian standardization organization)

Mr James Rubin received research funding from MTHR UK, a research program partly funded by the telecommunication industry (Mobile Manufacturers Forum, MMF);

Mr Joachim Schüz participate in cohort study (Cosmos) funded by major telecommunications companies, previously research funding from GSM Association and MMF (Interphone) and EPRI (US Electric Power industry).

2. The result: a misleading report on potential health effects from EMF

The biased and misleading outcome of the SCENIHR 2015 report was expected considering the composition of the working group. A rational assessment of this body of scientific literature would reasonably conclude that:

A. There is consistent evidence of harm for many possible health effects, considerable reasons for concern, as presented by Bioinitiative group in their 2012 report and in their comment to the Commission on the SCENIHR report 2015 (http://www.bioinitiative.org/ and http://www.bioinitiative.org/submission-of-comments-on-final-scenihr-opinion-from-the-bioinitiativeworking-group/) and as concluded by 190 EMF scientists in May 2015. (11 https://www.emfscientist.org/)

B. There is a division among the experts in the field and inconsistencies in the research results. Inconsistencies in research results cannot be used as an argument (as in the SCENIHR opinion) that there is no risk. A growing and significant number of research results invalidate opinions that there are no potential health effects.

C. There are strong economic interests from the industry concerned, why industry funding of research outcomes and of experts are important to take into consideration and highlight.

The example of the brain tumour risk from mobile phone use

We have thoroughly analysed the section on brain tumour risks from mobile phone use as an example of the quality of the SCENIHR report. The SCENIHR conclusion:

> "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. Some studies raised questions regarding an increased risk of glioma and acoustic neuroma in heavy users of mobile phones. The results of cohort and incidence time trend studies do not support an increased risk for glioma while the possibility of an association with acoustic neuroma remains open."

was only made possible by the following manoevres :

- Highlight a few very flawed studies that did not find any risks, without reporting accurately on their shortcomings (the cohort studies)

- Dismiss repeated studies that show increased risks, by others considered to be the most reliable for health risk assessment (IARC and the Italian Supreme court for instance)

- Rely heavily on selective brain tumour incidence trend data while burying worrisome increasing brain tumour incidence data.

The following examples illustrate the false and misleading presentation of some key studies claimed to show no increased risk of brain tumours:

Case control study Cefalo The SCENIHR final opinion claims that the Cefalo study shows no increased risks. This is incorrect as, on the contrary, the study indicates increased risk in most analyses and a statistically significant increased risk (+115%) for children with the longest mobile phone subscription. The report also claims that "Use of cordless phones showed no increased OR../.. not even in the group of highest cumulative use." This conclusion is false. The Cefalo study only included the first three years of cordless phone use. The risk for children with the highest cumulative use is therefore unknown, a fact that is well known by the author of this section, Mr. Schuz, who is also one of the authors of the Cefalo study. The study was largely funded by a Swiss mobile industry foundation.

Cohort study Frei et al. 2011, Denmark. This update of a Danish cohort, first published in 2001, reported no increased risks of tumours of the central nervous system, based on some 400 000 mobile phone subscribers whose health were compared to the rest of the Danish population. The study has not actually been maintained. The only parameter of possible exposure is the time that has passed since each individual subscribed the first time. The study contains so many flaws that it is uninformative as to brain tumour risks from mobile phone use, which must be well known by the author of this section, again Mr. Schuz, since he is also co-author of this cohort. He chose not to mention the disturbing fact that the Danish Cohort contained severe flaws, for instance:

1. It included mobile phone subscribers in Denmark between 1982 and 1995 but excluded the heaviest users, the 200 000 corporate users of mobile phones. They were thus treated as if they did not use a mobile phone, and ended up in the control group, the rest of the population supposed to be unexposed. Corporate users were by far the most exposed group. In 1999, an average corporate user in Sweden used a mobile phone for outgoing conversations six times more than an average private user. (PTS: Svensk Telemarknad 2003. Page 69 and 72. Available online https://www.pts.se/sv/Dokument/Rapporter/Telefoni/2004/Svensk-telemarknad-2003---PTS-ER-200424/)

2. In addition, all users with a subscription that started after 1995 were also excluded and were included in the unexposed control group. The study treated everyone who started to use a cell phone after 1995, as if they had never used one, although the number of cell phone users in Denmark more than doubled between 1995 and 1997. (Microwave News: The Danish Cohort Study: The Politics and Economics of Bias, November 3, 2011 http://microwavenews.com/DanishCohort.html) By the year 2000 there were over 3 million subscriptions in the control group. Those people could have accumulated 7 or 11 years of mobile phone use by the end of 2007, the cut-off date for this study. But these potentially heavy users also ended up in the "unexposed" control group. (https://betweenrockandhardplace.wordpress.com/2015/04/01/guest-blog-from-mona-nilsson-on-recentscenihr-report/)

3. All users of cordless/DECT phones, as well as non-subscribers using the mobile phone were also treated as unexposed.

These flaws make the conclusions of the SCENIHR final opinion on the Danish cohort invalid.

Brain tumour incidence time trends

The SCENIHR report claims that the brain tumour incidence trends do not mirror an increased brain tumour risk. This is used in addition to the Danish cohort as the main argument against the repeated case control studies showing all increased brain tumour risks from mobile phone use. Once again SCENIHR has cherry-picked data supporting the no-risk hypothesis and omitted conflicting data.

The SCENIHR report notably relies on combined Nordic statistics, omitting to mention that the Swedish brain tumour registry does not seem to be reliable as the brain tumour incidence is presumably underreported to the Swedish Cancer Registry (Barlow 2009, Åsa Klint, Swedish Cancer Registry, Hardell and Carlberg 2015 (http://www.ncbi.nlm.nih.gov/pubmed/25854296)).

Danish cancer statistics contradict the combined Nordic and the Swedish data and the SCENIHR conclusions, but this conflicting data is ignored by the SCENIHR report. The Danish brain tumour trends also strongly contradict the Danish cohort based on the same population. The incidence of tumours in the brain and the central nervous systems in Denmark increased by 41.2% in men and 46.1% in women between 2003 and 2012. SCENHIR chose to not inform about these worrisome trends. Instead they relied on another study that mixed data from Denmark, Sweden and other Nordic countries. (Deltour et al. 2011: Mobile phone use and incidence of glioma in the Nordic countries 1979-2008: consistency check; Epidemiology. 2012 Mar;23(2):301-7. doi: 10.1097/EDE.0b013e3182448295.)

In this way the disturbing Danish statistics were neutralised by the underreported Swedish trends. Coauthor: again Dr. Joachim Schüz who must have been aware of the separate Danish data from his close collaboration with Danish Cancer Society. In November 2012 the very same Danish Cancer Society sent out a press release highlighting a worrisome increase in brain tumours in Denmark (http://microwavenews.com/short-takes-archive/spike-brain-cancer-denmark).

According to the British Medical Journal falsification of data “ranges from fabrication to deceptive selective reporting of findings and omission of conflicting data, or willful suppression and/or distortion of data. . .”. The US Office of Research Integrity defines falsification as “manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented.” The above examples show that the SCENIHR report meets the criteria for scientific misconduct or fraud.

A clear majority of recent scientific papers on mobile phones and head tumours shows that mobile phone use increases the head tumour risk. These studies stand out also in qualitative terms, according to several meta-analyses, including the IARC assessment 2011.

3. NGO demands and suggestions

The SCENIHR published opinion will have a huge impact on Public Health policies and standards. However, it is grossly misleading and thereby a threat to the health of the European citizens. We welcome the recent recommendations4 of the European Ombudsman to obtain more balanced expert groups with fewer conflicts of interests.

EU citizens and decision-makers will not receive correct information about EMF health risks unless expert assessments are impartial and made as intended: in the interest of public health. The NGOs therefore demand:

1. An annulment of the SCENIHR report on EMF health risks.

2. The appointment of a new balanced, transparent and contradictory expert group without conflicts of interest by an unbiased steering group.

3. A new balanced and independent assessment.

4. The establishment of a permanent stakeholder committee at DG SANCO, where NGO viewpoints can be truly pronounced and considered in the decision process on EMF policy, legislation, research and expert assessment.

g) Verrender A et al paper - Can explicit suggestions about the harmfulness of EMF exposure exacerbate a nocebo response in healthy controls?

Author links open overlay panel AdamVerrenderabSarah P.LoughranabcAnnaDaleckibcFrederikFreudensteinabcRodney J.Croftabc

https://www.sciencedirect.com/science/article/abs/pii/S0013935118303347?via%3Dihub

Highlights

- Results do not support a relationship between radiofrequency exposure and symptoms.
- Healthy participants exhibited a nocebo response during believed radiofrequency exposure.
- Awareness and belief are crucial in the presentation of symptoms.
- The nocebo response may be exacerbated by alarmist media reports.

Abstract

While there has been consistent evidence that symptoms reported by individuals who suffer from Idiopathic Environmental Intolerance attributed to Electromagnetic Fields (IEI-EMF) are not caused by EMF and are more closely associated with a nocebo effect, whether this response is specific to IEI-EMF sufferers and what triggers it, remains unclear. The present experiment tested whether perceived EMF exposure could elicit symptoms in healthy participants, and whether viewing an 'alarmist' video could exacerbate a nocebo response. Participants were randomly assigned to watch either an alarmist ($N = 22$) or control video ($N = 22$) before completing a series of sham and active radiofrequency (RF) EMF exposure provocation trials (2 open-label, followed by 12 randomized, double-blind, counterbalanced trials). Pre- and post-video state anxiety and risk perception, as well as belief of exposure and symptom ratings during the open-label and double-blind provocation trials, were assessed. Symptoms were higher in the open-label RF-ON than RF-OFF trial ($p < .001$). No difference in either symptoms ($p = .183$) or belief of exposure ($p = .144$) was observed in the double-blind trials. Participants who viewed the alarmist video had a significant increase in symptoms ($p = .041$), state anxiety ($p < .01$) and risk perception ($p < .001$) relative to the control group. These results reveal the crucial role of awareness and belief in the presentation of symptoms during perceived exposure to EMF, showing that healthy participants exhibit a nocebo response, and that alarmist media reports emphasizing adverse effects of EMF also contribute to a nocebo response.

Summary of criticism:

- Bias
- The article was not available online when checked, but the abstract was. It appears to be just another attempt to drive home psychogenic dogma in respect of purportedly 'idiopathic' environmental health conditions. It is clearly designed to delegitimize the sharing of information that may provoke anxiety but that citizens nevertheless have a (democratic) right to share and access. Such Orwellian public health 'concern trolling' is as transparent as it is unethical.

h) World Health Organisation. Radiofrequency fields; Public Consultation Document, released October 2014

The WHO's report of 2014 is also subject to major criticism. This is set out in an email sent to me below:

Dear Jessica and Phil,

I imagine that the WHO 2014 draft is referenced by the ICNIRP 2020 guidelines p.524 as:

World Health Organization. Radiofrequency fields; Public Consultation Document, released October 2014. Geneva: WHO; 2014.

There is a useful discussion of the conflicts of interest and use of the same clique or cartel of thermalist- and industry-sympathetic scientists in:

L Hardell : World Health Organization, radiofrequency radiation and health - a hard nut to crack (Review) 2017

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5504984/

Hardell's abstract states:

In 2014 the WHO launched a draft of a Monograph on RF fields and health for public comments. It turned out that five of the six members of the Core Group in charge of the draft are affiliated with International Commission on Non-Ionizing Radiation Protection (ICNIRP), an industry loyal NGO, and thus have a serious conflict of interest. Just as by ICNIRP, evaluation of non-thermal biological effects from RF radiation are dismissed as scientific evidence of adverse health effects in the Monograph. This has provoked many comments sent to the WHO. However, at a meeting on March 3, 2017 at the WHO Geneva office it was stated that the WHO has no intention to change the Core Group.

Hardell's paper is a vital and authoritative account.- as you'll know, he has spent most of his life dealing with the WHO and IARC in different ways.

My understanding is that before WHO can recommend a EMF Guideline (eg ICNIRP), it should undertake a EHC, environmental health criteria assessment - ie review of all the current literature. Of course, it cannot do this, otherwise it would have to adopt long-term biological guidelines like Bionitiative, EUROPAEM, Seletun or IGNIR, since the WHO's own IARC already classifies NIR as a 2B carcinogen. Therefore it keeps putting off its review and relies instead on drafts which obviously have no formal status. This allows the same cartel as those behind ICNIRP guidelines to also produce the draft EHC at the same time, and they also control SCENIHR and SSM.

It seems outrageous for the WHO to recommend ICNIRP guidelines, which I think they still do, when the WHO EHC criteria on which these guidelines are supposed to be based cannot be produced because they would have to include long-term non-thermal effects whereas the guidelines explicitly deceive in stating that they only "consider" non-thermal effects. - p.487:

"For the purpose of determining thresholds, evidence of adverse health effects arising from all radiofrequency EMF exposures is considered, including those referred to as'low-level' and 'non-thermal', and including those where mechanisms have not been elucidated"

but they then refuse to set long-term guidelines (ie. not based on 6 or 30 minutes), as required by accepting, and not just considering, non-thermal effects.

see Hardell p.407 etc:

Two years after the anticipated 'formal risk assessment' by WHO in 2012 a draft was launched in 2014 (http://www. who.int/peh-emf/research/rf_ehc_page/en/). It was open for public consultation until December 31, 2014, but is now [2017] *closed according to the WHO home page. It was stated that: 'The process used in developing the chapters is described in Appendix X. Note that the chapters 1, 13 and 14 which will provide a summary, health risk assessment and protective measures are not available for this consultation. The drawing of conclusions from the literature and the drafting of these chapters is the remit of a formal Task Group that will be convened by WHO at a later stage in the process.' It must be regarded to be unusual and scientifically inadequate not to provide for review the health risk assessment and protective measures which would be most important parts of the Monograph. Furthermore, it turned out that of the six members in the WHO Core Group four are active members of ICNIRP and one is a former member. This was published in 2016 (52) and also discussed more recently (8). Only one person seems to be independent of ICNIRP, see Table I. Several persons have also affiliation(s) to other advisory groups, authorities and/or committees. Six of the 20 additional experts are affiliated with ICNIRP. Being a member of ICNIRP is a conflict of interest in the scientific evaluation of health hazards from RF radiation through ties to military and industry. This is particularly true since the ICNIRP guidelines are of huge importance to the influential telecommunications, military and power industries. Another conflict of interest is for members officially assessing possible health effects below their own set ICNIRP guidelines, which they have already stated as being safe, see also discussion in (52). Such persons would hardly have different opinions than those stated by ICNIRP. Critical views are not heard and a balanced scientific evaluation is not obtained.*

The muddle in which the WHO finds itself is exemplified in having to reformulate teams in 2018 and again in 2020 to reevaluate the evidence which should have been available in 2012 for the new version of ICNIRP guidelines in 2016 postponed to 2020;

https://www.who.int/peh-emf/research/rf_ehc_page/en/index1.html

"RELAUNCH Call for Expressions of Interest for systematic reviews (2020)

The World Health Organization's (WHO) Radiation Programme has an ongoing project to assess potential health effects of exposure to radiofrequency electromagnetic fields in the general and working population. To prioritize potential adverse health outcomes, WHO conducted a broad *international survey* in 2018. Ten major topics were identified for which WHO will now commission systematic reviews to analyze and synthesize the available evidence."

See eg

https://www.who.int/peh-emf/research/rf_ehc_page/en/

Radio Frequency fields

An Environmental Health Criteria Monograph

The World Health Organization is undertaking a health risk assessment of radiofrequency electromagnetic fields, to be published as a monograph in the Environmental Health Criteria Series. This publication will complement the monographs on static fields (2006) and extremely low frequency fields (2007), and will update the monograph on radiofrequency fields (1993).

This shows that ICNIRP 2020 is based effectively on EHC 1993 for RF, since 2014 was only a draft.

In 2013 the WHO was still intending to produce its RF EHC to replace 1993 but this failed and it is now trying again - all pointless since its ICNIRP has published its unscientific 2020 Guidelines which only "consider" non-thermal effects but do not actually set levels based on them:

2013 WHO:

https://www.who.int/peh-emf/research/rf_ehc_page/en/index3.html

Consultation on the scientific review for the upcoming WHO Environmental Health Criteria (Fall 2013)

The public consultation is now closed

The World Health Organization is undertaking a health risk assessment of radiofrequency electromagnetic fields, to be published as a monograph in the Environmental Health Criteria Series. This publication will complement the monographs on static fields (2006) and extremely low frequency fields (2007), and will update the monograph on radiofrequency fields (1993).

The draft chapters of this document which contain the scientific content are now open for technical consultation by RF experts. We are seeking comments on the accuracy and completeness of the information contained in these chapters. Please note that the literature searches have been done up to December 2012 (in a few instances to December 2013), so the more recent studies are currently not yet included. While the searches and chapters will be updated before finalization of the document, any suggestions for inclusion of peer reviewed studies are welcomed.

I hope you can glean something from all this.

The WHO-ICNIRP-SCENIHR-SSM-PHE process is a fraud and scam since it all depends on the same people setting, evaluating and then approving and recommending the same unscientific short-term heating-only levels without including the many established non-thermal effects which require the levels established by Bioinit/EURPAEM/Seletun/IGNIR.

Trump is right to regard the WHO, already legally subservient to the IAEA in radiation matters since 1959, as an offshoot of big business and China. Bill Gates is now the WHO's biggest funder, but he has no medical training. WHO is not essentially health orientated but answerable to the UN and it works with the ITU rather than doctors.

Similarly, the person in charge of the WHO's EMF project, van Deventer, is a trained electrical engineer and not a physician experienced in dealing with people with ES/EHS as one might expect.

Therefore ICNIRP's 2020 guidelines cannot be protective since they are not science based but based on Schwan's invalidated 1953 heating hypothesis.

SCHEDULE 11B - Dr. Leendert Vriens – CRITIQUE OF ICNIRP GUIDELINES

Physicist, former Philips Research Fellow

ICNIRP guidelines do not protect against harmful health effects - Stralings Bewust, 1st June 2020 (auto-translation)

In the judgment in summary proceedings to stop the roll-out of 5G, it appeared that the judge, like the Dutch state, fully relied on the exposure guidelines of the ICNIRP . That is striking since there is really a lot to criticize.

Dr. Leendert Vriens, physicist and former Philips Research Fellow, has written an extensive commentary on these guidelines from the ICNIRP. This comment is also attached to the summons to the summary proceedings that the Stop5GNL Foundation conducted against the Dutch state. All parties have therefore been able to take this information.

Given the great importance that the government attaches to these ICNIRP guidelines, we place the full article by Dr. Leendert Vriens below, so that everyone can determine for themselves whether it is wise to blindly sail on these guidelines.

Summary of comments on the ICNIRP 2020 guidelines

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) circulated new guidelines for exposure to electromagnetic fields (EMF) in March 2020 as a pre-publication. According to ICNIRP, these guidelines are intended to protect people from the adverse health effects of radio frequency EMF in the frequency range of 100 kHz to 300 GHz. This includes all wireless communications, including 5G. As far as field strengths and radiation intensities are concerned, these guidelines do not differ from those from 1998 and therefore offer no protection.

The guidelines refer to the first five introductory pages, up to p. 37, only on thermal effects caused by 6 minutes and 30 minutes of exposure to radio frequency EMF. Those times are defined somewhat more clearly in ICNIRP 2020 than in ICNIRP 1998, but that is of no further importance. Both guidelines concern short-term exposure.

Only in Appendix B, from p. 37 until the end of the guidelines on p. 43, a few more scientific publications on non-thermal biological long-term effects have been mentioned, discredited and not included in determining the guidelines.

This has ignored virtually all of the thousands of peer-reviewed scientific publications demonstrating such non-thermal biological long-term effects. Some of these effects, which occur at field strengths and radiation intensities under and far below the ICNIRP 2020 guidelines, are harmful to health. The ICNIRP guidelines therefore, contrary to what is claimed, do not protect against harmful health effects.

In view of the great financial interests of the telecom industry and governments, it is obvious to conclude that the orders of magnitude too high ICNIRP 2020 guidelines are only intended to

prevent the roll-out of wireless communication applications in general and of 5G in particular from being strobe-wide. to lay the road.

Preface

In March 2020, the International Commission on Non-Ionizing Radiation Protection (ICNIRP) issued new guidelines for the pre-publication (1) of exposure to electromagnetic fields (EMF) from wireless communications. These guidelines would be intended for: “the protection of humans exposed to radiofrequency electromagnetic fields (EMFs) in the range 100 kHz to 300 GHz”.

This appendix addresses the question of whether “humans” are actually protected by these guidelines and is intended as an addition to the summons in the Kort Geding (2) that was sent on 25-02-2020, before the publication of the ICNIRP prepublication. . At the end of this appendix, special attention is given to 5G.

ICNIRP 1998

In the Netherlands, guidelines published by ICNIRP in 1998 have so far been applicable (3). These should guarantee the health of citizens as long as the field strength or radiation load remains below the guidelines. In reality, they only take into account acute harmful thermal (heating) effects caused by short-term exposure to said electromagnetic fields (EMF) and not long-term harmful effects caused by non-thermal biological processes in which heating of our body or parts thereof is negligible . For clarification, we quote from (3):

Only established effects were used as the basis for the proposed exposure restrictions. Induction of cancer from long-term EMF exposure was not considered to be established, and so these guidelines are based on short-term, immediate health effects such as stimulation of peripheral nerves and muscles, shocks and burns caused by touching conducting objects, and elevated tissue temperatures resulting from absorption of energy during exposure to EMF. In the case of potential long-term effects of exposure, such as an increased risk of cancer, ICNIRP concluded that available data are insufficient to provide a basis for setting exposure restrictions,… ”

The letter of 16 April 2019 sent to the President of the House of Representatives and signed on behalf of the Government by the Secretary of State for Economic Affairs MCG Keijzer and the Minister for Medical Care and Sport, BJ Bruins, states (4) that the Dutch exposure guidelines are based on, and we quote, **"scientifically established effects that may occur during or shortly after exposure." All long-term effects are therefore excluded.**

Non-thermal biological effects have now been demonstrated in thousands of peer-reviewed scientific publications, including for EMF exposures below and well below the Dutch (ICNIRP) guidelines. Warming of our body or parts thereof is negligible. Several of those effects are harmful or potentially harmful to our health, especially in the long term. In the writ of summons (2) on pp. 38 to 45 referred to scientific (overview) articles in this field.

ICNIRP 2020

The ICNIRP 2020 exposure guidelines are in the frequency range of 10 MHz to 300GHz, which includes all wireless communications, equal to or wider than those in ICNIRP 1998. The main subpoena commentary on the ICNIRP 1998 guidelines - based on the subpoena

mentioned in the subpoena and other scientific studies - was that those ICNIRP guidelines are many orders of magnitude too high. This is due to the fact that the harmful effects of non-thermal biological effects have not been included in the determination of the guidelines.

That comment applies in full and to a greater extent to the new ICNIRP 2020 guidelines, given that non-thermal biological effects have still not been included, despite the thousands of scientific publications published since 1998, demonstrating the harmfulness or potential harmfulness of those effects . All arguments discussed in the subpoena therefore remain applicable.

In the following we will discuss some specific points regarding ICNIRP 2020.

1. Long-term effects

Page 2 of ICNIRP 2020 starts with the text:

"The main objective of this publication is to establish guidelines for limiting exposure to EMFs that will provide a high level of protection for all people against substantiated adverse health effects from exposures to both short- and long-term, continuous and discontinuous radiofrequency EMFs."

The difference with ICNIRP 1998 is that it gives the impression that long-term effects are now included. However, in the main body of ICNIRP 2020 and in Appendix A, the term “long-term” does not occur once and in Appendix B four times, with in all cases a denial of the existence or the harmfulness of this “long- term”. term ”securities. In more detail:

1a . Cognitive functions

Appendix B on 37 of the 43-page text - states: "In summary, there is no substantiated experimental or epidemiological evidence that exposure to radiofrequency EMFs affects higher cognitive functions relevant to health."

In reality, there are many scientific publications showing that these radiofrequency EMF do influence cognitive functions. First of all, we refer to the TNO report (5) from 2003, in which the influence of GSM and UMTS-like fields on subjects was specifically investigated. From the summary we quote:

“From our research it is concluded that our hypotheses to find no relation between presence of RF-fields and the measured parameters is rejected. We have found statistically significant relationship between UMTS-like fields with a field strength of 1 V / m and an effect on the Well Being. Further, from the cognitive tasks, it is observed that a number of significant effects is found ”.

At a field strength of 1 V / m, a factor of 60 under the ICNIRP 1998 guideline, and thus with a radiation intensity of a factor of 3600 under the ICNIRP guideline, statistically significant effects on well-being and cognitive performance were already found.

In the relevant parts of the first BioInitiative report from 2007 (6) and the update of that part from 2014 (7), an extensive literature review can be found on neurological problems caused by “cell phone radiation” , including cognitive effects. Prof. Lai, the author of these articles, has also analyzed the difference between the studies financed by the telecom industry and the

studies financed by independent bodies. In (6) reference is made to 23 studies of cognitive effects. Biological effects were identified in 13 of these. Of the 10 no-effect studies, 6 were fully and one partially funded by the telecom industry.

1b. National Toxicology Program and Ramazzini research

Two large-scale studies - from the US National Toxicology Program (NTP) and from the Ramazzini Institute, where the subpoena on pp. 42 and 43 referred to - have been brought down in ICNIRP 2020 without sound arguments. The qualifications used are: “ inconsistencies”, “important limitations” and “ insufficient statistical methods” .

All this, however, without even a single specification of what these imperfections would consist of. Especially in the case of the NAP study, an external committee of specialists was set up to check all measuring procedures and results on the spot, precisely in view of the importance of the study. That committee tightened up the final conclusions because, in their opinion, the authors / researchers had formulated the results too cautiously.

The relevant comments in ICNIRP 2020 cannot be otherwise viewed as discrediting investigators and researchers who come up with undesirable scientific results for industry. Such practices are known from other areas where economic interests also play a major role.

EMC Committee of the Health Council

Professor Kromhout, chair of the EMV committee of the Health Council of the Netherlands in Telegraaf (8): He emphasizes that the NTP investigation was 'a breakthrough'. "You see that certain groups try to explain that away. But they are well-executed studies. ”

Kromhout calls it 'very special' that the ICNIRP standards 'have received so much say in Europe'. And he states, very carefully, that just looking at heat is not enough. "If you see that under the level of 1 degree warming, which ICNIRP maintains, all kinds of effects do occur, you have to go a step further at some point."

1c and 1d. Unspecified long-term studies and auditory nerve cancer

The third reference to “long-term” refers to long-term studies that, according to ICNIRP, would have been too short and that would not have given consistent results. None of these studies are specifically mentioned - with reference to the list of references. The relevant paragraph only refers to a study by Martin Röösli, member of the ICNIRP. The fourth reference concerns the only publication in the three bibliographies with a “long-term” in the title. That publication is about the relationship between “acoustic neuroma” (cancer of the auditory nerve) and mobile phone use. On the subject of cancer we go on pp. 5 and 6 further in.

2. Guidelines based on negation of non-thermal biological effects

After introductory chapters on procedures and an explanation of the parameters and units used, intended for readers who are not at home in this area, ICNIRP 2020 starts at p. 5 on substantive topics.

The first mentioned on p. 5 are "nerve stimulation" and "permeability of cell membranes" . The further article shows that these topics did not play a role in establishing the ICNIRP exposure

guidelines for the frequencies from 10 MHz to 300 GHz, which includes all wireless communications. We limit ourselves to that area in our comments.

Then it goes in pp. 5 - 9 only about temperature effects: “steady-state temperature rise”, “body core temperature”, “local temperature” and “rapid temperature rise”.

Then in pp. 9 - 21 discussed the drafting of the ICNIRP 2020 guidelines and these guidelines are laid down in tables (2 - 9). From the text and from the above and the captions of these tables it appears that only temperature increases caused by short (6 or 30 minutes) exposure to the radio frequency EMF have been decisive for the realization of these guidelines. All harmful long-term effects are again excluded. These non-thermal biological effects, described in thousands of scientific publications, have been ignored or discredited.

Two appendices have been added to the main body of ICNIRP 2020.

Appendix A (pp. 21 - 36) provides information on modeling the energy absorption caused by the EMF and the temperature increases caused by it. This modeling does not provide information about the non-thermal biological effects that should be involved in determining the guidelines. Namely, as mentioned, the threshold values of the harmful effects caused thereby are many orders of magnitude lower than those caused by thermal effects.

Appendix B (pp. 36 - 43) is entitled: “Health risk assessment literature”. In this part, a number of topics are treated very selectively. We will illustrate this selectivity with a few examples.

Cancer

At the end of ICNIRP 2020 (p. 42) the subject of cancer is stated: "In summary, no effects of radiofrequency EMFs on the induction or development of cancer have been substantiated."

This is already in contradiction with the aforementioned NTP and Ramazzini studies and is also in contradiction with the op p. 41 studies by Lerchl et al. (9) and Tillmann et al., In which:

"Tumor promotion by exposure to radiofrequency electromagnetic fields below exposure limits for humans" has been confirmed, according to the title (and content) of the publications by Lerchl et al. and from Tillmann et al.

WHO and IARC-WHO

In Appendix B, the WHO only refers to a non-scientific “WHO progress report” (10) in which only organizational matters are discussed. And while there are three relevant scientific IARC-WHO publications, written by a working group of 31 scientists from 14 countries, all specialists in this field. [IARC stands for International Agency for Research on Cancer, the WHO subdivision dealing with everything related to cancer.]

The collaboration in the said working group has led to:

(i) The classification in 2011 of radio frequency EMF of wireless communication as possibly carcinogenic to humans (11) (class 2B), the same class in which DDT, leaded petrol and chloroform are classified.

(ii) A scientific article in The Lancet Oncology (12) which states, among other things, that children are at extra risk from radiofrequency EMF loads.

(iii) A 430-page IARC-WHO monograph (13), published in 2013, concluding in chapter 6:

“There is limited evidence in humans for the carcinogenicity of radiofrequency radiation. Positive associations have been observed between exposure to radiofrequency radiation from wireless phones and glioma, and acoustic neuroma. ”

This confirms the classification in class 2B referred to in point (i).

There is also a leading update from 2018 (14), containing the following “Highlights” :

• Increased risk of brain, vestibular nerve and salivary gland tumors are associated with mobile phone use.

• Nine studies (2011–2017) report increased risk of brain cancer from mobile phone use.

• Four case-control studies (3 in 2013, 1 in 2014) report increased risk of vestibular nerve tumors.

• Concern for other cancers: breast (male & female), testis, leukemia, and thyroid.

• Based on the evidence reviewed it is our opinion that IARC's current categorization of RFR as a possible human carcinogen (Group 2B) should be upgraded to Carcinogenic to Humans (Group 1).

All this information has been completely ignored in ICNIRP 2020. Scientifically speaking, this is not permissible.

In Appendix B, many other topics are discussed in a similar one-sided way. We will discuss one of these, “fertility, reproduction and childhood development” (pp. 40-41). The final conclusion is: "In summary, no adverse effects of radiofrequency EMF exposure on fertility, reproduction, or development relevant to human health have been substantiated."

This conclusion completely contradicts what has been reported in the relevant part of the BioInitiative report (15). The “Conclusions” therein:

“Though causal evidence of one or more mechanism (s) are not yet fully refined, it is generally accepted that oxidative stress and free radical action may be responsible for the recorded genotoxic effects of EMFs which may lead to impairments in fertility and reproduction. Free radical action and / or hydrolytic enzymes like DNAase induced by exposure to EMFs may constitute the biochemical actions leading to adverse changes in hormones essential in males and female reproduction, DNA damage, which in turn causes damage to sperm motility, viability, and sperm morphology . Such exposures are now common in men who use and who wear wireless devices on their body, or use wireless-mode laptop computers. It may also account for damage to ovarian cells and female fertility, and miscarriage in women (ELFEMF at 16 mG intermittent exposure). ”

Such substantive scientific information cannot be found in ICNIRP 2020 and is also completely ignored there. That too is scientifically unacceptable.

5G

The rollout of 5G in the Netherlands was discussed in detail in the subpoena (2). It has been argued that insufficient attention has been paid by the State and research has been done into the adverse health effects of a national 5G network. The correctness of this has been confirmed by Prof. Kromhout, chairman of the EMV committee of the Health Council, who has stated that no research has been conducted into the health effects of 5G for the higher frequencies (3.5 - 3.8 GHz and above). In the USA, it was also confirmed in a “Hearing of the US Congress” by the Federal Communication Commission (FCC), following questions from Senator Blumenthal, that no research has been conducted in this frequency range.

The writ of summons has already substantiated (points 47 - 49) that with the use of 5G the radiation intensity will be increased and that additional health problems can be expected as a result.

There are two other important problems with regard to the radiation intensity and its effect on health. The first is that the range of radiation at higher frequencies is considerably reduced and that the radiation is disturbed and absorbed much faster by obstacles and rain. The increase in the radiation intensity is necessary to extend the range and to partially compensate for disturbance effects.

Also, at higher (5G) frequencies, the depth of penetration of the radiation (EMF) into our body becomes smaller, see table 10 in (1). With the same radiation intensity, the absorption of the radiation in the skin is increased proportionally because this radiation is absorbed in a smaller volume (smaller depth). Together with the already higher 5G intensities this gives a double increase in absorption in the skin and just below it, so that additional problems are to be expected, how serious cannot be predicted given that no research has been done yet. The roll-out of 5G can therefore be seen as a large-scale experiment with uncertain results regarding the extent to which the health problems of the population have worsened.

A salient detail is that the House of Representatives sent a request for advice to the Health Council on 5-11-2019 to issue advice based on current scientific insights about possible health risks in relation to 5G (16). So only in November last year while 5G has been in development for years and huge amounts are involved in the rollout. The Government has never even asked the Health Council for such advice, while it has been published for decades about the harmfulness of the EMF (or radiation) of wireless communication and information has been sent to the Government and the House of Representatives for many years.

Conflict of interest

In several publications, members of the private organization ICNIRP have been accused of conflicts of interest and links with the telecom industry. In one review publication (17), Prof. Hardell - oncologist and member of the IARC-WHO working group responsible for the class B classification of RF radiation - provides inside information about the relationships between ICNIRP, WHO and the telecom industry and about the differences between the WHO and the IARC-WHO, the latter organization being more independent. For further information about the conflict of interest, we also refer to (18).

It should also be noted that the telecom industry works closely with governments and that governments have major financial interests in the telecom industry. Therefore, governments cannot be seen as independent in this area either. Nor does the EMV Knowledge Platform, which was funded by the government, the telecom industry and energy companies in the years 2014 to 2019.

In six court cases in Italy (19), it has been confirmed by judgment that the brain tumors of employees who had to make long-term mobile calls because of their work were caused by that mobile phone use. In their judgments, the judges gave less weight to the studies of the defense, mainly paid by industry, than to the studies of independent researchers. Less weight was also given to studies by members of ICNIRP and SCHENIHR because of “conflicts of interest”. Similar statements, recognizing cell phone use or other long-term radiation exposure from wireless communications as the cause of brain tumors or other physical complaints, have also been made in Spain, France and Australia.

Other subjects

In the above, we have limited ourselves to commenting on the ICNIRP 2020 guidelines. This only provides limited insight into the entire area.

For more information about scientifically proven harmful non-thermal biological effects, i.e. when exposed under the ICNIRP standards, we refer to the summons on pp. 38 - 45 independent investigations. It has shown, among other things: the formation of reactive radicals, single and double breaks in DNA, the formation of micronuclei, the formation of stress hormones and the permeability of the blood-brain barrier, which allows toxic substances to penetrate into the brain.

For information about measures taken in other countries, as in the subpoena, we refer to the Compilation (20) and to a selection of some of the most important items therein with additional information (21). The subpoena goes on pp. 45 - 50 on those measures, as well as the fact that no insurance company insures health damage caused by the EMF of wireless communication.

In the previous it has been made clear that the ICNIRP 2020 guidelines, as well as those from 1998, are orders of magnitude too high. The question can be asked which standards should then be used. Now there are the still valid older Russian (Eastern Bloc) standards that were known in the West as early as 1976 (22). With regard to field strength, these standards are a factor 10 stricter than the ICNIRP guidelines, while radiation intensity is a factor 100 stricter.

The difference with the ICNIRP guidelines is that the Russians took into account the long-term effects already known to them at the time. This concerned experiences with radar operators and military research with radio frequency fields. A post-1998 study found that with pulsed signals, such as those used for wireless communications, the guidelines would need to be revised down by about a factor of 10. But that does not explain the even more factor 1000 stricter SBM guidelines for the radiation intensities, drawn up by construction biologists, doctors and scientists. SBM stands for “Standard der Baubiologisch Messtechnik” .

The latest version of the SBM guidelines dates from 2015 (23). This takes into account the experiences of electro-hypersensitive (EHS) persons, namely that many people have no or little trouble with the radio-frequency EMF for a long time, but then after an sometimes years-long cumulative exposure EHS can become with orders of magnitude increased sensitivity. Such an effect is also known with some allergies.

Finally, for the layman in this area, a few clarifying explanations about misconceptions that are going around:

a) It is claimed that the photons of the RF radiation (EMF) do not have enough energy to cause damage to our body. That is quite correct, but that is not the point. We are not dealing with single photons (wireless communication would not be possible), but with gigantic numbers of photons that vibrate in the same way and together make the EMF. With an EMV with a field strength of 1 V / m, which occurs regularly, 10 21 photons per second pass through an area of 1 m 2 . The EMF built up as a result penetrates into our body and can cause damage. This is the simplest explanation, the reality is more complicated.

b) It is said that the sun's radiation is much more intense than that of wireless communication and that the latter therefore cannot cause any damage. In the middle of a sunny day, the intensity (in mW / m 2) of the sunlight is indeed a factor of 1000 to 10,000 or more higher than that of the EMV of wireless communication. **But that is not the point. The photons of the sun do not work together and do not emit an electric field at all, unlike the EMF of wireless communication. For a further explanation see (24).**

Link to article in Dutch:

https://stralingsbewust.info/2020/06/01/icnirp-richtlijnen-bieden-geen-bescherming-tegen-schadelijke-effecten-voor-de-gezondheid/

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02-04-2020

SCHEDULE 12

COUNCIL OF EUROPE'S ARTICLE ON DANGERS OF EMFS

Parliamentary Assembly
Assemblée parlementaire
http://assembly.coe.int

COUNCIL OF EUROPE
CONSEIL DE L'EUROPE

Resolution 1815 (2011)[1]
Final version

The potential dangers of electromagnetic fields and their effect on the environment

Parliamentary Assembly

1. The Parliamentary Assembly has repeatedly stressed the importance of states' commitment to preserving the environment and environmental health, as set out in many charters, conventions, declarations and protocols since the United Nations Conference on the Human Environment and the Stockholm Declaration (Stockholm, 1972). The Assembly refers to its past work in this field, namely Recommendation 1863 (2009) on environment and health: better prevention of environment-related health hazards, Recommendation 1947 (2010) on noise and light pollution, and more generally, Recommendation 1885 (2009) on drafting an additional protocol to the European Convention on Human Rights concerning the right to a healthy environment and Recommendation 1430 (1999) on access to information, public participation in environmental decision-making and access to justice – implementation of the Århus Convention.

2. The potential health effects of the very low frequency of electromagnetic fields surrounding power lines and electrical devices are the subject of ongoing research and a significant amount of public debate. According to the World Health Organization, electromagnetic fields of all frequencies represent one of the most common and fastest growing environmental influences, about which anxiety and speculation are spreading. All populations are now exposed in varying degrees to electromagnetic fields, the levels of which will continue to increase as technology advances.

3. Mobile telephony has become commonplace around the world. This wireless technology relies upon an extensive network of fixed antennae, or base stations, relaying information with radio-frequency signals. Over 1.4 million base stations exist worldwide and the number is increasing significantly with the introduction of third generation technology. Other wireless networks that allow high-speed Internet access and services, such as wireless local area networks, are also increasingly common in homes, offices and many public areas (airports, schools, residential and urban areas). As the number of base stations and local wireless networks increases, so does the radio-frequency exposure of the population.

4. While electrical and electromagnetic fields in certain frequency bands have wholly beneficial effects which are applied in medicine, other non-ionising frequencies, whether from extremely low frequencies, power lines or certain high frequency waves used in the fields of radar, telecommunications and mobile telephony, appear to have more or less potentially harmful, non-thermal, biological effects on plants, insects and animals as well as the human body, even when exposed to levels that are below the official threshold values.

5. As regards standards or threshold values for emissions of electromagnetic fields of all types and frequencies, the Assembly strongly recommends that the ALARA (as low as reasonably achievable) principle is applied, covering both the so-called thermal effects and the athermic or biological effects of electromagnetic emissions or radiation. Moreover, the precautionary principle should be applied when scientific evaluation does not allow the risk to be determined with sufficient certainty. Given the context of growing exposure of the population, in particular that of vulnerable groups such as young people and children, there could be extremely high human and economic costs if early warnings are neglected.

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1. Text adopted by the Standing Committee, acting on behalf of the Assembly, on 27 May 2011 (see Doc. 12608, report of the Committee on the Environment, Agriculture and Local and Regional Affairs, rapporteur: Mr Huss).

6. The Assembly regrets that, despite calls for the respect of the precautionary principle and despite all the recommendations, declarations and a number of statutory and legislative advances, there is still a lack of reaction to known or emerging environmental and health risks and virtually systematic delays in adopting and implementing effective preventive measures. Waiting for high levels of scientific and clinical proof before taking action to prevent well-known risks can lead to very high health and economic costs, as was the case with asbestos, leaded petrol and tobacco.

7. Moreover, the Assembly notes that the problem of electromagnetic fields or waves and their potential consequences for the environment and health has clear parallels with other current issues, such as the licensing of medication, chemicals, pesticides, heavy metals or genetically modified organisms. It therefore highlights that the issue of independence and credibility of scientific expertise is crucial to accomplish a transparent and balanced assessment of potential negative impacts on the environment and human health.

8. In light of the above considerations, the Assembly recommends that the member states of the Council of Europe:

8.1. in general terms:

8.1.1. take all reasonable measures to reduce exposure to electromagnetic fields, especially to radio frequencies from mobile phones, and particularly the exposure to children and young people who seem to be most at risk from head tumours;

8.1.2. reconsider the scientific basis for the present standards on exposure to electromagnetic fields set by the International Commission on Non-Ionising Radiation Protection, which have serious limitations, and apply ALARA principles, covering both thermal effects and the athermic or biological effects of electromagnetic emissions or radiation;

8.1.3. put in place information and awareness-raising campaigns on the risks of potentially harmful long-term biological effects on the environment and on human health, especially targeting children, teenagers and young people of reproductive age;

8.1.4. pay particular attention to "electrosensitive" people who suffer from a syndrome of intolerance to electromagnetic fields and introduce special measures to protect them, including the creation of wave-free areas not covered by the wireless network;

8.1.5. in order to reduce costs, save energy, and protect the environment and human health, step up research on new types of antenna, mobile phone and DECT-type device, and encourage research to develop telecommunication based on other technologies which are just as efficient but whose effects are less negative on the environment and health;

8.2. concerning the private use of mobile phones, DECT wireless phones, WiFi, WLAN and WIMAX for computers and other wireless devices such as baby monitors:

8.2.1. set preventive thresholds for levels of long-term exposure to microwaves in all indoor areas, in accordance with the precautionary principle, not exceeding 0.6 volts per metre, and in the medium term to reduce it to 0.2 volts per metre;

8.2.2. undertake appropriate risk-assessment procedures for all new types of device prior to licensing;

8.2.3. introduce clear labelling indicating the presence of microwaves or electromagnetic fields, the transmitting power or the specific absorption rate (SAR) of the device and any health risks connected with its use;

8.2.4. raise awareness on potential health risks of DECT wireless telephones, baby monitors and other domestic appliances which emit continuous pulse waves, if all electrical equipment is left permanently on standby, and recommend the use of wired, fixed telephones at home or, failing that, models which do not permanently emit pulse waves;

8.3. concerning the protection of children:

8.3.1. develop within different ministries (education, environment and health) targeted information campaigns aimed at teachers, parents and children to alert them to the specific risks of early, ill-considered and prolonged use of mobiles and other devices emitting microwaves;

8.3.2. for children in general, and particularly in schools and classrooms, give preference to wired Internet connections, and strictly regulate the use of mobile phones by schoolchildren on school premises;

8.4. concerning the planning of electric power lines and relay antenna base stations:

8.4.1. introduce town planning measures to keep high-voltage power lines and other electric installations at a safe distance from dwellings;

8.4.2. apply strict safety standards for the health impact of electrical systems in new dwellings;

8.4.3. reduce threshold values for relay antennae in accordance with the ALARA principle and install systems for comprehensive and continuous monitoring of all antennae;

8.4.4. determine the sites of any new GSM, UMTS, WiFi or WIMAX antennae not solely according to the operators' interests but in consultation with local and regional government authorities, local residents and associations of concerned citizens;

8.5. concerning risk assessment and precautions:

8.5.1. make risk assessment more prevention oriented;

8.5.2. improve risk-assessment standards and quality by creating a standard risk scale, making the indication of the risk level mandatory, commissioning several risk hypotheses to be studied and considering compatibility with real-life conditions;

8.5.3. pay heed to and protect "early warning" scientists;

8.5.4. formulate a human-rights-oriented definition of the precautionary and ALARA principles;

8.5.5. increase public funding of independent research, in particular through grants from industry and taxation of products that are the subject of public research studies to evaluate health risks;

8.5.6. create independent commissions for the allocation of public funds;

8.5.7. make the transparency of lobby groups mandatory;

8.5.8. promote pluralist and contradictory debates between all stakeholders, including civil society (Århus Convention).

SCHEDULE 13

EU MEMORANDUM OF 2011

(Report | Doc. 12608 | 06 May 2011

The potential dangers of electromagnetic fields and their effect on the environment

Committee on the Environment, Agriculture and Local and Regional Affairs

Rapporteur : Mr Jean HUSS, Luxembourg, SOC

Origin - Reference to the committee: Doc. 11894, Reference 3563 of 29 May 2009. 2011 - May Standing Committee)[1]

The summary of the report is below:
Summary

The potential health effects of the very low frequency of electromagnetic fields surrounding power lines and electrical devices are the subject of ongoing research and a significant amount of public debate. While electrical and electromagnetic fields in certain frequency bands have fully beneficial effects which are applied in medicine, other non-ionising frequencies, be they sourced from extremely low frequencies, power lines or certain high frequency waves used in the fields of radar, telecommunications and mobile telephony, appear to have more or less potentially harmful, non-thermal, biological effects on plants, insects and animals, as well as the human body when exposed to levels that are below the official threshold values.

One must respect the precautionary principle and revise the current threshold values; waiting for high levels of scientific and clinical proof can lead to very high health and economic costs, as was the case in the past with asbestos, leaded petrol and tobacco.

Below is now an extract from the report:

9. Scientific studies and arguments pursued by associations and NGOs, by groupings of scientists, by the European Environment Agency and by the European Parliament

Serious scientific and medical studies revealing biological effects of a pathological nature have existed since the 1930s concerning radio frequencies and microwaves from radar installations. Studies in the late 1970s also pointed out the harmful effects of protracted exposure to the low or very low frequency electromagnetic fields of electrical transmission lines or computer screens. .The WHO's IARC (International Agency for Research on Cancer) classified these fields as "possibly carcinogenic" for humans (Group 2B) in 2001.

41. The rapporteur recalls the proven positive biological effects of certain medical applications (electrotherapies) of electromagnetic fields and microwaves at very low intensity. If there are such beneficial effects in certain frequency bands, then adverse biological effects on the human body should be just as much in the realm of plausibility or possibility.

[1] http://assembly.coe.int/nw/xml/XRef/Xref-XML2HTML-en.asp?fileid=13137

42. Scientific studies concerning the negative effects of certain microwave frequencies on plants, insects and wildlife or farm animals are disturbing in more than one respect and the scientific studies disclosing potentially pathogenic biological effects on the human body are also important and not to be merely brushed aside.

43. These studies are very numerous indeed: the 2007 “Bioinitiative” report analysed over 2 000 of them, and more were added by an important monograph published in 2010 by the Ramazzini Institute, the national institute for study and control of cancer and environmental diseases in Bologna, Italy.

44. A significant number of top scientists and researchers have banded together in a dedicated international body entitled ICEMS, “International Commission for Electromagnetic Safety”, in order to carry out independent research and recommend that the precautionary principle be applied in the matter. In 2006 (Benevento Resolution) and 2008 (Venice Resolution), these scientists published instructive resolutions calling for the adoption of far tougher new safety standards and rules.

45. Scientific studies disclose athermic or biological effects of electromagnetic fields or waves on cells, the nervous system, genetics, etc., which essentially fall into three categories: biological effects influencing the metabolism, sleep, the electrocardiogram profile; effects observed in experimentation on animals or in cell cultures (in vitro); effects emerging from epidemiological studies on prolonged use of mobile telephones or on living near high voltage power lines or base stations of relay antennas.

46. The term “biological effect” is used to refer to a physiological, biochemical or behavioural change brought about in a tissue or a cell in response to an external stimulus. Not every biological effect necessarily poses a serious threat to health; it may simply show the normal response of the cell, tissue or organism to that stimulus.

47. A medical or pathological biological effect, on the other hand, is an effect that may imperil the organism’s normal functioning by causing more or less severe symptoms or pathologies. Precisely, a growing number of scientific studies made by teams of high-level academic researchers demonstrate the existence of potentially or definitely pathological biological effects.

48. The rapporteur acknowledges that it is not possible within the compass of this report to analyse and summarise the findings of all these studies. A synopsis of the greater number of them (some 2 000) was produced in the “Bioinitiative” report, a report drawn up by 14 scientists of international standing who concurred, regarding mobile telephony and other radio frequencies, as to abnormally high incidence of brain tumours and acoustic neuroma, effects on the nervous system and cerebral functions, and effects on genes, cell stress proteins and the immune system. In this context, it has been observed for instance that radio frequency exposure can cause inflammatory and allergic reactions and impair the immune function even at levels well below the norms of exposure for the public.

49. A major programme of research into the specific features of these effects such as genotoxicity of waves (REFLEX programme), funded by the European Commission and involving 12 European research teams, was launched and the results were made public in December 2004. The conclusions of the report were disturbing on several counts as the results bore out genotoxic effects of mobile telephone waves, and in particular greater frequency of chromosomal deletions and breakup of DNA molecules in different types of

cultivated human and animal cells. In addition, stress protein synthesis was greatly increased and gene expression was modified in various types of cells.

50. Concerning the Interphone study, the biggest epidemiological survey was carried out on mobile phone users and their exposure to glioma, meningioma, acoustic neuroma and tumours of the parotid gland after protracted use of their mobile telephones. The partial early results published on 18 May 2010 by IARC more than ten years after the commencement of the study pointed to profound disagreement between the different teams of researchers (16 teams from 13 countries) over the interpretation of these results. The study co-ordinator, Ms Elisabeth Cardis, summed up a kind of compromise by saying that the study did not reveal an increased risk, but one could not conclude that there was no risk because there were sufficient results suggesting a possible risk. Indeed, some results show that lasting intensive use very significantly increases the risks of glioma (40% and even 96% looking at ipsilateral use, that is to say where the glioma has appeared at the side of the head to which the telephone was held) and the meningioma risks (15%; 45% for ipsilateral use).

51. The rapporteur feels that one of this epidemiological study's principal weaknesses lies in the fact that the period of mobile phone use analysed, extending until the early years of the 21st century, is probably too short at less than 10 years to reach conclusive results given the period of latency and growth of cerebral tumours. In fact, ionising radiation (radioactivity) is recognised as a cause of brain cancer, but cases due to radioactivity rarely become apparent before 10 or 20 years of exposure.

52. The Interphone study, performed solely on adults, nevertheless raises serious speculation as to what will happen, after 15 or 20 years of intensive use, to the young adults, teenagers or even children who are currently the biggest users and in whom absorption of the radiation is still greater and more problematic.

53. The rapporteur would like to emphasise another side of the potential risks: while attention is focused at present on the radiation from mobile phones, and while he appeals for the wisest possible use of this device, by children and young people especially, it is inescapable that for some years there have been many other sources of electromagnetic fields and radio frequencies.

54. Whether outside or inside offices and dwellings, we are now exposed to a whole variety of electromagnetic frequencies on top of the chemical pollutants in the air that we breathe or accumulated in the food chain. Outdoors or indoors, we encounter the electromagnetic fields or the radio frequencies of the (nearby) electric power lines and of the base stations of GSM, UMTS and WiFi relay antennas or of, for example, radio or radar stations. Besides these, inside offices or private residences there is very often the radiation of cordless telephones (DECT), baby phones and other devices of wireless technology.

55. What is more, industrialists seek a further expansion of mobile telephony infrastructures for hosting the fourth generation (4G) facility with the intention of delivering a secure, comprehensive broadband mobile system for the cordless modems of laptop computers, "smart" mobile phones and other portable backup devices for broadband mobile Internet access, games services, etc.

56. In Israel, the ministries concerned (environment, health, communication) fall back on the application of the precautionary principle, opposing the introduction of these new

infrastructures on the grounds that the effects of the irradiations should be verified before authorising new systems.

57. A question that always strongly arouses the European populations is the problem of where base stations and relay antennas are sited. In parallel to certain local or regional studies (mainly Swiss and German), describing the advent of health problems in farm animals after the installation of mobile telephone relay antennas near some farms, describing unaccountable problems of infertility, deformity, cataracts, etc., certain local or regional epidemiological studies, carried out by groups of scientists and doctors, have succeeded in also showing certain disease symptoms in residents of districts or villages near relay antennas installed a few months or years ago. These local studies were carried out in France, Germany, Switzerland, Austria, etc.

58. According to these epidemiological and also partly clinical studies, symptoms of sleeping disorders, headaches, blood pressure problems, dizziness, skin trouble and allergies appeared or increased some time after relay antennas were commissioned or their beams intensified. by raising the number or the power of the antennas. The scientific value of such local studies is regularly queried by the operators and very often the security and regulatory bodies too, and so a most recent study released early in 2011 in a German medical publication (Umwelt-Medizin-Gesellschaft 1/2011) is nonetheless worthwhile and revealing, although the number of participants in the study (60 persons) remains quite small. These persons, from the locality of Rimbach in Bavaria, underwent analysis before a new relay antenna base station came into service in January 2004, then afterwards in July 2004, January 2005 and July 2005. In this study, as in similar epidemiological studies, the symptoms that increased or became aggravated after the station began operating were sleep disorders, headaches, allergies, dizziness, and concentration problems.

59. Doctors and scientists measured and determined significant changes in concentrations of stress-related and other hormones in urine samples. There was a significant increase of adrenalin and noradrenalin over several months and a significant reduction of dopamine and phenylethylamine (PEA), changes indicating a state of chronic stress which, according to the authors of the study, caused the aforesaid heightened symptoms. The authors correlate the lowered PEA levels with impaired attention and hyperactivity in children, disorders which significantly increased in Germany from 1990 to 2004.

60. Here, too, the rapporteur stresses that some people may be more sensitive than others to electromagnetic radiation or waves. The research performed, for instance, by Professor Dominique Belpomme, President of the Association for Research on Treatments Against Cancer (ARTAC), on more than 200 people describing themselves as “electrosensitive” succeeded, with corroborative results of clinical and biological analyses, in proving that there was such a syndrome of intolerance to electromagnetic fields across the whole spectrum of frequencies. According to these results, not only proximity to the sources of electromagnetic emissions was influential, but also the time of exposure and often concomitant exposure to chemicals or to (heavy) metals present in human tissues. In this context, Sweden has granted sufferers from electromagnetic hypersensitivity the status of persons with reduced capacity so that they receive suitable protection.

61. In connection with the proven or potential risks of electromagnetic fields, it should also be noted that after a Lloyd’s report, insurance companies tended to withhold coverage for risks linked with electromagnetic fields under civil liability policies, in the same way as, for example,

genetically modified organisms or asbestos, which is hardly reassuring given the potential risks that stem from these electromagnetic fields.

62. Finally, the rapporteur wonders whether it might not be expedient and innovative to try and develop new wireless communication technologies, equally powerful but more energy-efficient and above all less problematic in terms of the environment and health than the present microwave-based wireless communication. Systems such as optical or optoelectronic communication technologies employing visible and infrared light are reportedly being developed in the United States and Japan and could largely replace the present technologies. Should such changes in transmission and communication systems prove realistic, it would then be a case of technological and economic innovations not to be missed or obstructed.

10. Conclusions

63. The potentially harmful effects of electromagnetic fields on the environment and human health have not yet been fully elucidated and a number of scientific uncertainties continue to exist in that regard. Nevertheless, anxieties and fears over the health hazards posed by the waves remain in wide sectors of the population, as do the demands voiced by high-level scientists, by groupings of doctors and by the associations of concerned citizens which abound in many Council of Europe member states.

64. The precautionary principle and the right to a healthy environment, particularly on behalf of children and future generations, must be key factors in all economic, technological and social development of society. In that regard, the Parliamentary Assembly has decided on several previous occasions (see Recommendation 1863 (2009) on environment and health: better prevention of environment-related health hazards and Recommendation 1959 (2011) on preventive health care policies in the Council of Europe member states) that coherent, effective preventive measures must be taken to protect the environment and human health.

65. After analysing the scientific studies available to date, and also following the hearings for expert opinions organised in the context of the Committee on the Environment, Agriculture and Local and Regional Affairs, there is sufficient evidence of potentially harmful effects of electromagnetic fields on fauna, flora and human health to react and to guard against potentially serious environmental and health hazards.

66. That was moreover already the case in 1999 and 2009 when the European Parliament overwhelmingly passed resolutions upholding the precautionary principle and efficient preventive actions vis-à-vis the harmful effects of electromagnetic fields, in particular by substantially lowering the exposure thresholds for workers and the general public according to the ALARA principle, by restoring genuine independence of research in that field, and through a policy of enhanced information and transparency towards the anxious populations (see European Parliament Resolution of 2 April 2009 on health concerns associated with electromagnetic fields, 2008/2211 INI).

67. Lastly, the Assembly could endorse the analyses and warnings issued first in September 2007, then in September 2009, by the European Environment Agency (EEA), concerning the health hazards of electromagnetic fields, mobile telephony and not least mobile phones. According to the EEA, there are sufficient signs or levels of scientific evidence of harmful biological effects to invoke the application of the precautionary principle and of effective, urgent preventive measures.

SCHEDULE 14

SCHEDULE 9 – DR MARTIN PALL'S ARTICLE CRITICISING SCENIHR FOLLOWED BY PROF DENIS HENSHAW'S COMMENTS

SUMMARY OF FLAWS IN SCENIHR 2015

The first set of flaws, is that SCENIHR is perfectly willing to make statements which they know or should have known are false. The most egregious example of this is the Speit/Schwarz controversy described at the beginning of this chapter where there are seven clear falsehoods created by SCENIHR, each of which greatly strengthens the telecommunications industry propaganda positions. There are many others, described in this chapter that are substantive, but less egregious than the Speit/Schwarz falsehoods.

There is a vast literature, both in the review literature and in the primary literature studies, that disagrees strongly with the SCENIHR positions and is completely ignored by SCENIHR. In a few cases, such studies are cited and very briefly discussed by SCENIHR but then they have no impact on the assessments that SCENIHR makes in the SCENIHR 2015 document [73]. In most cases, they are neither cited nor discussed. The situation here is similar to an organization that has two sets of books, the fake books that are used in public and then a genuine set of books that includes all of the data that are too inconvenient to be included in the fake set of books.

The finally, we have three additional considerations which interact with each other to produce the completely bogus logic used by SCENIHR and by other organizations that have taken positions similar those taken by SCENIHR. One of those considerations comes from our knowledge that pulsation pattern, cell type, polarization and frequency can all influence biological effects and that there are exposure windows that produce much larger effects than are seen with either lower or higher intensities. Our knowledge of these factors mean that it is possible for the telecommunications industry to foster any number of studies where it is unlikely that statistically significant evidence of effects will be seen. I have presented examples where this may have been done.

One of the most bizarre things about the SCENIHR 2015 document [73] is that there is a sentence on p. 101 where they state "In some of these cases, the effect seemed to be dependent on the cell type investigated and by the electromagnetic parameters applied (frequency, modulation)." Modulation and pulsation are the same thing. They know about these three factors and therefore, they know that these factors may explain differences in results obtained by different studies. But they still falsely assume that such differences imply inconsistencies in results and falsely assume that it makes sense to simply count apparent positive and apparent negative studies as a way of assessing whether there are effects or not.

SCENIHR has often falsely stated that these studies show no effects as opposed to lack of statistical significance of any effects. SCENIHR 2015 document has 125 places where such bogus claims of "no effect" are found. They repeatedly claim the literature is inconsistent but studies done under different conditions are not inconsistent because they are more likely to be due to genuine biological heterogeneity of responses. The false logic described here is used, in turn, to support another highly pervasive false

logic. I've documented where SCENIHR has simply counted numbers of studies showing so many findings of effects and some other number of findings of "no effect." But these numbers are meaningless, when the studies are done under different conditions and where the "no effect" numbers can easily be inflated by studies designed to produce such results. They are also, of course, meaningless, when large numbers of studies that show effects are eliminated by SCENIHR by the simple process of pretending they don't exist. You can see from this, that the entire logical framework behind the SCENIHR 2015 [73] document is completely bogus.

Lastly, before going on to the situation in the U.S. and with 5G, there is one other thing I want to state here. In 2005, Dr. Jared Diamond published a book [111] entitled "Collapse: How Societies Choose to Fail or Succeed." In it he documents how each society that "chose to fail," chose paths that had some short term gains but also had much more severe longer-term consequences. This is exactly what we have been doing with the EMFs, except that the consequences are much more severe than the collapse of one society – here all of the advanced technology societies on earth are at great risk.

Professor Denis Henshaw provided the following insight into the comments made by Dr Pall:

5G Risk: The Scientific Perspective

Written and Compiled by Martin L. Pall, PhD Professor Emeritus of Biochemistry and Basic Medical Sciences Washington State University

Chapter 5, page 41: The Importance of the SCENIHR 2015 Document and the Many Omissions, Flaws and Falsehoods in That Document

Page 41: The Speit/Schwarz Controversy: How SCENIHR Has Put Out Seven Falsehoods in Support of the Industry Progaganda Position

I am going to start by discussing a single particularly important issue from [73].

(**Reference [73] is**: SCENIHR, 2015. Health effects of EMF – 2015 Scientific Committee on Emerging and Newly Identified Health Risks SCENIHR: opinion on potential health effects of exposure to electromagnetic fields (EMF). https://ec.europa.eu/health/scientific_committees/emerging/ docs/scenihr_o_041.pdf (accessed Sept. 7, 2017))

At the end of Table 5 in [73]. **there is a claim that a 2013 study by Speit et al [74] was unable to replicate the findings of a 2008 study published by Schwarz et al [75]**.

In Table 5 they state further that **Speit el al found "No effect on DNA integrity (MN) and DNA migration (comet); Repetition study of Schwarz et al, 2008**."

(What is called loss of DNA integrity here, measured by formation of micronuclei (MN), is caused by the formation of double strand breaks in cellular DNA. The comet assay measures single strand breaks in cellular DNA).

Schwarz et al [75] found strong evidence that there were large increases in both **single strand and double strand breaks in cellular DNA** following very low intensity exposures to

a **cell phone-like pulsed radiation**, but SCENIHR **claims that Speit et al [74] were unable to repeat the earlier study**. Elsewhere (p.89, bottom) SCENIHR states that "By using the same exposure system and the same experimental protocols as the authors of the original study, **they failed to confirm the results**. They did not find any explanation for these conflicting results (Speit et al, 2013)."

A careful examination of both [74] and [75] finds the following:

1. Speit et al [74] used a **lymphocytic cell line, HL-60**; Schwarz et al [75] studied **human fibroblasts**. This is a big difference because, as we have already said, different cell types behave differently.

2. Speit et al [74] used **1800 MHz radiation**; Schwarz et al [75] used **1950 MHz radiation** (the frequency of UMTS, also called 3G). Again we have a potentially important difference because effects are influenced by the frequency used.

3. Speit et al [74] **used a continuous wave EMF**; Schwarz et al [75] **used a highly pulsed EMF**, with high levels of both KHz and MHz pulsations to mimic the pulsation pattern of 3G cell phones. This is expected to produce very large differences between the two studies.

4. Speit et al [74] **used a reverberation exposure chamber**; Schwarz et al [75] **did not use any exposure chamber**. This could be another very large difference between the two studies, a difference that will be discussed toward the end of this chapter.

5. **So where did the claim come from that Speit was trying to repeat the Schwarz study?** Speit et al [74] says in their paper that they were trying to repeat another study (not Schwarz) that was described in a report but was never published.

6. **Speit et al [74] do not even cite the Schwarz et al [75] pape**r, so obviously they did not intend to repeat Schwarz.

We have then **SCENIHR 2015 stating three multifaceted falsehoods** that Speit et al [74] tried to repeat the earlier studies of Schwarz et al [75], that they were unable to repeat those Schwarz et al [75] studies and that they used identical methodology to that used by Schwarz et al [75].

In addition to those three are four underlying falsehoods – namely that the two studies used very different methodologies, notably differing in the cell type studied, differing in the frequency used, differing widely in the in pulsations used and differing in the use of an exposure chamber. ***Each of these falsehoods are SCENIHR's not Speit et al [74]'s, each of them can be easily seen to be false by even a superficial reading of these two papers.***

As you might guess, there is a major story behind all of this. The very low intensity exposure used in the Schwarz et al [75] study produced large numbers of DNA breaks**, larger than that produced by 1600 chest X-rays**. This conclusion can be made by comparing the results of Schwarz et al [75] with the earlier study of Lutz and Adlkofer [76].

From this comparison, it seems clear that **non-ionizing radiation similar to 3G radiation can be much more dangerous to the DNA** of our cells than is a similar energy of ionizing radiation.

When this was found, the industry went into attack mode, attacking the two Professors who collaborated in [75], Prof. Franz Adlkofer in Germany and Prof. Hugo Rüdinger in Austria. The first couple of years of these attacks have been described in some detail on pp 117-131 in Dr. Devra Davis' book Disconnect [77]. Before the SCENIHR 2015 document was drafted, it was clear that the publishers who had published Adlkofer's and Rüdinger's work, not just the Schwarz et al [75] study but other papers by the same research group, had long since rejected the industry propaganda claims. In addition. Adlkofer had won a lawsuit in the German courts against his main accuser. He has subsequently since won a second such lawsuit. **The last paragraph on p.89 in SCENIHR 2015 is word for word industry propaganda. What is clear is that SCENIHR is wittingly or unwittingly serving as a propagandist for the industry** in and that process, SCENIHR has no difficulty in putting forth seven obvious, individually important falsehoods.

SCHEDULE 15

Nuremberg Code

https://history.nih.gov/research/downloads/nuremberg.pd

https://en.wikipedia.org/wiki/Nuremberg_Code

The origin of the Nuremberg Code began in pre–World War II German politics, particularly during the 1930s and 1940s. The pre-war German Medical Association was considered to be a progressive yet democratic association with great concerns for public health, one example being the legislation of compulsory health insurance for German workers. However, starting in the mid-1920s, German physicians, usually proponents of racial hygiene, were accused by the public and the medical society of unethical medical practices. The use of racial hygiene was supported by the German government in order to create an Aryan "master race", and to exterminate those who did not fit into their criteria. Racial hygiene extremists merged with National Socialism to promote the use of biology to accomplish their goals of racial purity, a core concept in the Nazi ideology. Physicians were attracted to the scientific ideology and aided in the establishment of National Socialist Physicians' League in 1929 to "purify the German medical community of 'Jewish Bolshevism'." Criticism was becoming prevalent; Alfons Stauder, member of the Reich Health Office, claimed that the "dubious experiments have no therapeutic purpose", and Fredrich von Muller, physician and the president of the Deutsche Akademie, joined the criticism.[1]

In response to the criticism of unethical human experimentation, the Reich government issued "Guidelines for New Therapy and Human Experimentation" in Weimar, Germany. The guidelines were based on beneficence and non-maleficence, but also stressed legal doctrine of informed consent. The guidelines clearly distinguished the difference between therapeutic and non-therapeutic research. For therapeutic purposes, the guidelines allowed administration without consent only in dire situations, but for non-therapeutic purposes any administration without consent was strictly forbidden. However, the guidelines from Weimar were negated by Adolf Hitler. By 1942, the Nazi party included more than 38,000 German physicians, who helped carry out medical programs such as the Sterilization Law.[2]

After World War II, a series of trials were held to hold members of the Nazi party responsible for a multitude of war crimes. The trials were approved by President Harry Truman on May 2, 1945 and were led by the United States, Great Britain, and the Soviet Union. They began on November 20, 1945 in Nuremberg, Germany, in what became known as the Nuremberg trials. In one of the trials, which became known as the "Doctors' Trial", German physicians responsible for conducting unethical medical procedures on humans during the war were tried. They focused on physicians who conducted inhumane and unethical human experiments in concentration camps, in addition to those who were involved in over 3,500,000 sterilizations of German citizens.[3][4]

Several of the accused argued that their experiments differed little from those used before the war, and that there was no law that differentiated between legal and illegal experiments. This worried Drs. Andrew Ivy and Leo Alexander, who worked with the prosecution during the trial. In April 1947, Dr. Alexander submitted a memorandum to the United States Counsel for War Crimes outlining six points for legitimate medial research.[5]

On August 20, 1947, the judges delivered their verdict against Karl Brandt and 22 others.[6] The verdict reiterated the memorandum's points and, in response to expert medical advisers

for the prosecution, revised the original six points to ten. The ten points became known as the "Nuremberg Code", which includes such principles as informed consent and absence of coercion; properly formulated scientific experimentation; and beneficence towards experiment participants. It is thought to have been mainly based on the Hippocratic Oath, which was interpreted as endorsing the experimental approach to medicine while protecting the patient.[7]

i) The ten points of the Nuremberg Code

The ten points of the code were given in the section of the verdict entitled "Permissable Medical Experiments":[5]

1. The voluntary consent of the human subject is absolutely essential.
2. The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study, and not random and unnecessary in nature.
3. The experiment should be so designed and based on the results of animal experimentation and a knowledge of the natural history of the disease or other problem under study that the anticipated results will justify the performance of the experiment.
4. The experiment should be so conducted as to avoid all unnecessary physical and mental suffering and injury.
5. No experiment should be conducted where there is an *a priori* reason to believe that death or disabling injury will occur; except, perhaps, in those experiments where the experimental physicians also serve as subjects.
6. The degree of risk to be taken should never exceed that determined by the humanitarian importance of the problem to be solved by the experiment..
7. Proper preparations should be made and adequate facilities provided to protect the experimental subject against even remote possibilities of injury, disability, or death.
8. The experiment should be conducted only by scientifically qualified persons. The highest degree of skill and care should be required through all stages of the experiment of those who conduct or engage in the experiment.
9. During the course of the experiment the human subject should be at liberty to bring the experiment to an end if he has reached the physical or mental state where continuation of the experiment seems to him to be impossible.
10. During the course of the experiment the scientist in charge must be prepared to terminate the experiment at any stage, if he has probable cause to believe, in the exercise of the good faith, superior skill and careful judgment required of him that a continuation of the experiment is likely to result in injury, disability, or death to the experimental subject.

j) Authorship

The Nuremberg Code was initially ignored, but gained much greater significance about 20 years after it was written. As a result, there were substantial rival claims for the creation of the Code. Some claimed that Harold Sebring, one of the three U.S. judges who presided over the Doctors' Trial, was the author. Leo Alexander, MD and Andrew Ivy, MD, the prosecution's chief medical expert witnesses, were also each identified as authors. In his letter to Maurice H. Pappworth, an English physician and the author of the book *Human Guinea Pigs*, Andrew Ivy claimed sole authorship of the Code. Leo Alexander, approximately 30 years after the trial, also claimed sole authorship.[8] However, after careful reading of the transcript of the Doctors'

Trial, background documents, and the final judgements, it is more accepted that the authorship was shared and the Code grew out of the trial itself.[9]

k) Significance

The Nuremberg Code has not been officially accepted as law by any nation or as official ethics guidelines by any association. In fact, the Code's reference to Hippocratic duty to the individual patient and the need to provide information was not initially favored by the American Medical Association. The Western world initially dismissed the Nuremberg Code as a "code for barbarians" and not for civilized physicians and investigators. Additionally, the final judgement did not specify whether the Nuremberg Code should be applied to cases such as political prisoners, convicted felons, and healthy volunteers. The lack of clarity, the brutality of the unethical medical experiments, and the uncompromising language of the Nuremberg Code created an image that the Code was designed for singularly egregious transgressions.[10]

However, the Code is considered to be the most important document in the history of clinical research ethics, which had a massive influence on global human rights. The Nuremberg Code and the related Declaration of Helsinki are the basis for the Code of Federal Regulations Title 45 Part 46,[11][12] which are the regulations issued by the United States Department of Health and Human Services for the ethical treatment of human subjects, and are used in Institutional Review Boards (IRBs). In addition, the idea of informed consent has been universally accepted and now constitutes Article 7 of the United Nations' International Covenant on Civil and Political Rights. It also served as the basis for International Ethical Guidelines for Biomedical Research Involving Human Subjects proposed by the World Health Organization.[8]

SCHEDULE 16

OTHER REFERENCES

http://www.5gappeal.eu/scientists-and-doctors-warn-of-potential-serious-health-effects-of-5g/

https://docs.wixstatic.com/ugd/c1889a_5ba4d04320c241bd965907b7addb7e98.pdf

https://drive.google.com/file/d/1qNcaWa85khAk9YO9Z2J3nAFmVw9eMTHw/view

https://www.computerweekly.com/feature/Mobile-phones-and-health-is-5G-being-rolled-out-too-fast

https://www.degruyter.com/view/j/reveh.2016.31.issue-4/reveh-2016-0060/reveh-2016-0060.xml?format=INT

https://www.theyworkforyou.com/whall/?id=2019-06-25b.294.0

Abstract from the 2nd Reference above, published in May 2019:

"ICNIRP, US FCC, EU and other EMF safety guidelines are all based on the assumption that average EMF intensities and average SAR can be used to predict biological effects and therefore safety. Eight different types of quantitative or qualitative data are analyzed here to determine whether these safety guidelines predict biological effects. In each case the safety guidelines fail and in most of these, fail massively. Effects occur at approximately 100,000 times below allowable levels and the basic structure of the safety guidelines is shown to be deeply flawed. The safety guidelines ignore demonstrated biological heterogeneity and established biological mechanisms. Even the physics underlying the safety guidelines is shown to be flawed. Pulsed EMFs are in most cases much more biologically active than are non-pulsed EMFs of the same average intensity, but pulsations are ignored in the safety guidelines despite the fact that almost all of our current exposures are highly pulsed. There are exposure windows such that maximum effects are produced in certain intensity windows and also in certain frequency windows but the consequent very complex dose-response curves are ignored by the safety guidelines. Several additional flaws in the safety guidelines are shown through studies of both individual and paired nanosecond pulses. The properties of 5G predict that guidelines will be even more flawed in predicting 5G effects than the already stunning flaws that the safety guidelines have in predicting r other EMF exposures. The consequences of these findings is that “safety guidelines” should always be expressed in quotation marks; they do not predict biological effects and therefore do not predict safety. Because of that we have a multi-trillion dollar set of companies, the telecommunication industry, where all assurances of safety are fraudulent because they are based on these "safety guidelines"."

https://www.somersetlive.co.uk/news/local-news/glastonbury-council-opposes-5g-roll-2998413
Article under ‘News’ within link below 5Gappeal.eu/. Glastonbury Council have halted roll-out 5G on safety concerns following Brussels lead. Many countries are protesting and some have been successful in halting.

http://www.5gappeal.eu/

Lead by Professor Hardell Phd from Sweden. Signatures from 253 scientist and doctors to date, asking for 5G to be halted as the science is showing biological affects including DNA Strand breaks with existing radiation levels.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727833/BT_Group_-_180212Mobile_annex_5FINAL.pdf

Scroll to Page 7 of this paper. It is from BT to DCMS (government body) stating their proposal in Annexe 5. On this page it states the estimated increase of all existing Macro Cells along with Millions of Small Cells with their proposed sites. No other Government release informs us of the numbers that I have found to date. Small Cells are mentioned but not precise amounts.

https://researchbriefings.files.parliament.uk/documents/POST-PB-0032/POST-PB-0032.pdf

Parliamentary paper outlining their intentions. Pay attention to Health Section. They Quote WHO but not accurately as the IARC/Who have classification EMF 2B Possibly Carcinogenic to Humans.

ICNIRP who use data from 1996 on affects of heating only. No Risk Assessment was carried out on 4G and the same for 5G which uses MM Waves and not used thus far for mobile connection. ICNIRP are a ‘Captured’ agency of thirteen and ignoring the science presented to them in ten’s thousands peer reviewed studies. Using the basis of thermal heating only as their guide. There was a $25 Million study commissioned by FDA (US equivalent body) which ran for a decade on Toxins called National Toxicology Programme. Two years of this were for affects from cell phone radiation. The results were peer reviewed and sent to FDA showing positive/possible results for three types cancers shown In Rats/Mice. The FDA took three days to conclude that the results could not be used as they were not specific to humans. They commissioned and approved the testing standards but did not like the results. All testing for Human Pharmaceutical products by the FDA are on animals.

https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm624809.htm?utm_source=feedburner&utm_medium=feed&utm_campaign=Feed%3A+FdaUpdates+%28FDA+Updates%29

Statement from Jeffrey Shuren on NTP findings. None of this is mentioned under Health in the Parliamentary paper 32 above.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6254861/

Comments from Professor Leonard Hardell about the response from FDA and other ‘controlled’ Agencies.

https://www.hamhigh.co.uk/news/opinion-jessica-learmond-criqui-we-must-suspend-5g-roll-out-1-6204140

https://www.hamhigh.co.uk/news/ham-high-letters-citizens-assemblies-waste-collections-brexit-and-5g-1-6228757

Martin Pall
https://docs.wixstatic.com/ugd/c1889a_5ba4d04320c241bd965907b7addb7e98.pdf

Joel Moskowitz https://www.saferemr.com/2018/07/icnirps-exposure-guidelines-for-radio.html

https://www.youtube.com/watch?v=bsaB7ewFsN0&list=PL7tOWNeoVyQ4w-QBGnq930OwesqVlbJki&index=4&t=0s

The above is a video of the lecture below by Professor Emeritus of Biochemistry and Basic Medical Sciences at Washington State University which lecture was given on 5 November, 2018.

He is a published and widely cited scientist on the biological effects of electromagnetic fields and speaks internationally on this topic. He is particularly expert in how wireless radiation impacts the electrical systems in our bodies.

He has published 7 studies showing there exists exquisite sensitivity to electromagnetic fields (EMFs) in the voltage sensor in each cell, such that the force impacting our cells at the voltage sensor has massive impact on the biology on the cells of our bodies.

He says in the lecture that the current safety guidelines for EMFs are 7.2m times too high. One of the impacts is that the forces exerted by EMFs on our cells create free radicals which attack our DNA. Developing brains in children are more sensitive to adult brains and may experience more damage.

The EMFs affect our collective brain function and reproductive function and the EMFs may impact our gene pool because mutations could occur. 5G will cause an ecological disaster among plants and animals and he warns that whole ecosystems could collapse.

He says that the industry states that microwaves won't penetrate the human body beyond 1cm. But that is not wholly true. While the electrical parts of the 5G microwaves may be absorbed, the magnetic parts will not and will put forces on the electrically charged groups of cells in our bodies.

He concludes by stating that the FCC and Congress in the US has approved the roll out of 5G without one singular biological safety test which is "absolute insanity".

https://healthimpactnews.com/2017/new-5g-cell-towers-and-smart-meters-to-increase-microwave-radiation-invade-privacy/

If you are interested in the impact of 5G microwaves on the human skin and the possible uses of this infrastructure against the public in future, do read the articles below:

https://washingtonsblog.com/2017/03/internet-things-cause-cancer.html

http://www.sbwire.com/press-releases/the-internet-of-things-poses-human-health-risks-scientists-question-the-safety-of-untested-5g-technology-at-international-conference-779643.htm#.WMM-9FE3jzM.twitter

https://eluxemagazine.com/magazine/dangers-of-5g/

https://ehtrust.org/key-issues/cell-phoneswireless/5g-networks-iot-scientific-overview-human-health-risks/

Tests of MMWs on animals show rare forms of heart and brain tumours, DNA damage, damage to the eyes and immune system, thermal injuries to the eyes with thermal effects reaching below the eye’s surface, damage to cell growth rate and even bacterial resistance

(https://eluxemagazine.com/magazine/dangers-of-5g/,
https://www.sciencedirect.com/science/article/pii/S0006291X15003988,
https://www.ncbi.nlm.nih.gov/pubmed/19667804,
https://www.ncbi.nlm.nih.gov/pubmed/7897988,
https://www.ncbi.nlm.nih.gov/pubmed/11855293,
https://link.springer.com/article/10.1007/s00253-016-7538-0).

Lloyds and Swiss Re refusing cover for 5G illnesses

https://www.businessinsurance.com/article/20070603/ISSUE03/100022051/insurers-exclude-risks-associated-with-electromagnetic-radiation

https://ehtrust.org/key-issues/cell-phoneswireless/telecom-insurance-companies-warn-liability-risk-go-key-issues/

https://www.businessinsurance.com/article/20070603/ISSUE03/100022051/insurers-exclude-risks-associated-with-electromagnetic-radiation

https://youtu.be/gX79M3VNn-Q

https://healthmeans.com/group/f2ce6d04-ae83-4aaa-b6c7-425559e13f4f

SCHEDULE 17 – EXTRACTS OF HOW ICNIRP VIEWS RISK ASSESSMENT

APPROACH TO HEALTH RISK ASSESSMENT Any single observation or study may indicate the possibility of a health risk related to a specific exposure. However, risk assessment requires information from studies that meet quality criteria as listed in the Appendix. Peer-reviewed literature usually provides information to judge the extent to which these criteria are met. Assessment of established risks normally requires consistent information from several such studies. ICNIRP, in carrying out its critical reviews, monitors the accumulation of new evidence, leading, as appropriate, to updating health risk assessments. These are based on the totality of the science, not just on the added information. In some cases, for example when a specific question or concern arises in public debate, or when a study appears that has or is perceived to have a major influence on the state of knowledge, a statement summarizing the scientific situation may be issued by ICNIRP. It is important to recognize that all assessments are based on current knowledge, and as such will be subject to revision in the light of new substantiated evidence. The following sections deal with the nature of health effects and how they can be related to exposure. In subsequent sections, methods for categorizing and evaluating studies are presented, including how conclusions are drawn from the compiled and evaluated database.

Approach to risk assessment

Biological effects without any identified adverse health consequences do not form a basis for limiting of exposure to NIR. However, ICNIRP recognizes that concern about other unsubstantiated health effects may in itself adversely affect the health of a person, and that this may be best addressed by providing appropriate information. The scientific evaluations performed by ICNIRP and other scientific advisory bodies could form a basis for such information. If, in parallel to adverse effects, beneficial health effects or other benefits are involved, a balanced judgement will be required as to how the exposure limits are used in the process of societal policies on addressing risks. Benefits may be manifested both on an individual and at a societal level, one example being the information carried by electromagnetic fields for radio and television services. However, as such a balance will often involve social or economic considerations, this judgement is best performed by national authorities.

Selection of studies. The use of quality-oriented selection criteria for the literature to be evaluated and clear and transparent methods for its evaluation add confidence that the results and conclusions of the health risk assessment are valid and can be considered to assess possible health hazards from NIR exposure. The evaluation is normally based on published peer-reviewed original scientific papers and reports. Technical reports may sometimes be acceptable as well, e.g., for details of exposure assessments. In this literature, descriptions of methods are normally given in sufficient detail to ascertain whether reasonable precautions were taken to meet requirements such as those given in the Appendix, and to assure that other researchers can reproduce the studies. In principle, well-designed and well-conducted studies should be published regardless of the outcome, because negative results are as useful as positive studies when considering the overall literature. In practice, this is not always the case, and the possibility of such publication bias should be considered. Evaluation process. The evaluation process used by ICNIRP consists of three steps. It is inevitable that

parts of this process are a matter of scientific judgement, and that details of the process may vary depending on the question addressed. Hence, the description below provides overall guidelines, not strict rules. The three steps are as follows: I Evaluating single studies in terms of their relevance to the health effects being considered and of the quality of methods used. The criteria described in the Appendix can be used as guidance in this evaluation, and may April 2002, Volume 82, Number 4 result in the exclusion of some studies from further use, or assigning different weights to studies, depending on their methodological quality. Such judgements should be made in light of the hypothesis to be evaluated, as the ability of a study to contribute to this evaluation may vary depending on the hypothesis. For each health effect evaluated, a review of all relevant information is required. At first, this review is normally done separately for epidemiological studies, for human laboratory, for animal studies and for in vitro studies, with further separations as appropriate for the hypothesis. Finally, the outcomes of these steps need to be combined into an overall evaluation including an evaluation of consistency of human data, animal data and in vitro data. ICNIRP's Standing Committees, with support from consulting members as appropriate, normally perform the first two steps of this process, while the full Commission in collaboration with the Standing Committees performs the last step. Overall evaluation. A decision must first be made whether the data considered allow the identification of an exposure hazard, i.e., an adverse health effect that is caused by an NIR exposure. By this identification, the effect becomes "established" in the sense used in the next chapter. In spite of the evaluation process described above, uncertainties and inconsistencies may still be encountered in comparative evaluations of the literature. Thus, it is recognized that this evaluation is at least partly based on scientific judgements. Various schemes and "criteria" exist in order to facilitate this judgement process (Hill 1965; IARC 1995). For an actual estimate of risk in the general population or in a specific group, the selected studies should provide additional information, including the definition of the biologically effective quantity, which may vary with organ; exposure-effect relationship, and identification of a threshold, if any; exposure distribution and identification of sub populations with high exposure; and differences in susceptibilities within a population. This information in whole or in part also in principle forms the necessary background for the development of advice including guidance on limiting exposure.

CONCLUDING REMARKS This document describes the philosophy and general methodology by which ICNIRP evaluates the scientific literature on possible health risks of non-ionizing radiation, and the procedures by which ICNIRP uses such data in formulating its advice on non-ionizing radiation exposure. In practice, the critical steps in applying these general procedures may differ across the non-ionizing radiation spectrum. Several steps in these procedures require scientific judgement, e.g., on reviewing the scientific literature and determining appropriate reduction factors. This document provides a transparent general framework for these procedures. Descriptions of procedures and deliberations specific to various frequency or wavelength regions and sources of information are disseminated by ICNIRP in its scientific reviews, guidelines, statements, and practical guides. Through its independence and structure as described in this document, ICNIRP is also well placed to consult widely on these issues.

SCHEDULE 18 – FURTHER CRITIQUES OF ICNIRP 2020 GUIDELINES

ICNIRP released draft guidelines in 2019 before they published them in 2020. latest draft of ICNIRP's revised proposals following their 'consultation' in 2018, as presented by van Rongen at the Paris ANFR conference on 17th April 2019- please see:

https://www.anfr.fr/fileadmin/mediatheque/documents/expace/workshop-5G/20190417-Workshop-ANFR-ICNIRP-presentation.pdf

Leonard Hardell said this about those guidelines then:

https://lennarthardellenglish.wordpress.com/2019/06/25/icnirp-draft-on-new-radiofrequency-guidelines-is-flawed/?utm_source=dlvr.it&utm_medium=twitter

ICNIRP draft on new radiofrequency guidelines is flawed

At a meeting in Paris on 17 April 2019 Eric van Rongen, the present ICNIRP chairman presented a draft on new ICNIRP guidelines for radiofrequency radiation (RFR) exposure. The presentation is freely available at the web although labeled as a 'draft – do not cite or quote'.

Most remarkable is that the science on health effects is still based on thermal (heating) effect from RFR just as the evaluations published 1998 and updated in 2009.

In the draft only thermal effects are considered for health effects (page 7). Van Rongen states there is 'No evidence that RF-EMF causes such diseases as cancer' (page 8).

These comments are based on the power point presentation. However, there is no evidence that non-thermal effects are considered and thus a large majority of scientific evidence on human health effects, not to mention hazards to the environment. Thus the basis for new guidelines is flawed and the whole presentation should be dismissed as scientifically flawed.

If this draft represents the final version on ICNIRP guidelines it is time to close down ICNIRP since their evaluation is not based on science but on selective data such as only thermal effects from RFR, see also www.emfcall.org.

The draft represents a worst-case scenario for public health and represents wishful thinking.

In a March 2020 article he confirms that ICNIRP's guidelines have ignored scientists (Appeals that matter or not on a moratorium on the deployment of the fifth generation, 5G, for microwave radiation)

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7016513/

"The fifth generation, 5G, for microwave radiation is about to be implemented worldwide in spite of no comprehensive investigations of the potential risks to human health and the environment. In an appeal sent to the EU in September, 2017 currently >260 scientists and

medical doctors requested for a moratorium on the deployment of 5G until the health risks associated with this new technology have been fully investigated by industry-independent scientists. The appeal and four rebuttals to the EU over a period of >2 years, have not achieved any positive response from the EU to date. Unfortunately, decision makers seem to be uninformed or even misinformed about the risks. EU officials rely on the opinions of individuals within the ICNIRP and the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR), most of whom have ties to the industry. They seem to dominate evaluating bodies and refute risks. It is important that these circumstances are described. In this article, the warnings on the health risks associated with RF presented in the 5G appeal and the letters to the EU Health Commissioner since September, 2017 and the authors' rebuttals are summarized. The responses from the EU seem to have thus far prioritized industry profits to the detriment of human health and the environment."

1. ICNIRP and the EU

Investigate Europe
(https://www.investigate-europe.eu/en/2019/how-much-is-safe/?portfolioCats=55%2C54)

The ICNIRP recommendations were adopted by the EU in its Council Recommendation of 1999, without considering long-term non-thermal effects. However, it should be stressed that at an international EMF conference in London (2008), Professor Paolo Vecchia, ICNIRP Chairman from 2004 to 2012, said about the exposure guidelines "What they are not": *"They are not mandatory prescriptions for safety", "They are not the' 'last word' on the issue"*, and *"They are not defensive walls for industry or others"* (25).

For all RF-based non-thermal EMF effects, SAR estimates are not an appropriate exposure metric, but instead either the field intensity or power density (PD) in combination with exposure duration should be used in safety standards (26, 14, 27). In contrast to the ICNIRP guidelines,
the Russian safety standards, are based on non-thermal RF effects, which were obtained by several research institutes in the former Soviet Union during decades of studies on chronic exposures to RF (28, 29).

SCHEDULE 19 – CRITIQUES OF ICNIRP

Dr. Hugo Schooneveld PhD – Netherlands

ICNIRP exposure standards inappropriate -Better protection for citizens against radiation sought

English: http://www.hugoschooneveld.nl/bestanden/Extern/ICNIRP exposure standards inappropriate.pdf

Summary
We need to get rid of the current system of standards and limits for the protection of citizens against electromagnetic fields (EMF), as recommended by the International Commission for Non-Ionizing Radiation Protection, the ICNIRP. These limits for radio frequency fields are based solely on limiting warming of the body ("thermal effects") and limits for low frequency fields are based on a combination of physiological effects in the body. For both frequency ranges, the limits are several orders of magnitude too high. Under normal living conditions, the field strengths experienced do not come close to these limits, while people do experience nuisance and develop "electrostress phenomena. So there are also "non-thermal effects", but ICNIRP denies their existence. Therefore, better standards should be developed that also protect electro-sensitive people against (weak) EMF at home or at work.We propose to abandon ICNIRP guidelinesfor citizens and adopt instead the limits of the physician organization EUROPAEM, for the time being. But ideally,we should develop new standards based on physiological criteria.Physical responses to incident EMF are diverse and complex and it is important to set up a 'think tank'with specialists in relevant biological disciplines to investigate the possibilities for biological standards. Realistic exposure limits for the electrosensitives should be the outcome.

Index:

Comments on draft of the new 2020 guidelines include excerps from **The Lies Must Stop Disband ICNIRP: Facts Matter, Now More Than Ever**

Louis Slesin (Editor), Microwave News, April 9, 2020

https://www.saferemr.com/2018/07/icnirps-exposure-guidelines-for-radio.html:

The first is from Eric van Rongen of The Netherlands, the current chairman of ICNIRP... Two minutes into his PowerPoint narration you can hear him say, "There is no evidence from all [this] scientific information for the induction of cancer by radiofrequency fields" ...

Anyone who has been paying any attention at all knows that ...*The U.S. National Toxicology Program has found "clear evidence" that exposure to RF radiation can lead to cancer.*

... the NTP study is only one of many that show an RF–cancer link. It's the most important and the most persuasive, but hardly the only one.

ICNIRP may not agree with the NTP finding, but that *is* what the $30 million animal study showed. Its members want you to think that they know better and that the NTP results are untrustworthy....

The second example comes from a[n annual] report prepared for the Swedish Radiation Safety Authority by a nine-member panel of experts ... Van Rongen and Switzerland's Martin Röösli, who is also on ICNIRP, are members of this panel....

... the NTP warning was the most important RF–health development not only of 2018, but of the decade and most likely of the new millennium. Yet the expert panel chose to ignore it.‡

... That was *the* headline news of 2018. "Clear evidence" was a game changer; leaving it out of the annual update is a sure sign of bias ... it could well have been the title of the panel's 2018 update. But van Rongen, Röösli and the others ignored it.

This cannot go on. The first step is for ICNIRP ... to be disbanded. The Swedish panel should also be dissolved and reconstituted with a more balanced membership. Indeed, all expert committees should be broadened to include those who allow that more than RF tissue heating may be at work.

In the same link:

"However, ICNIRP's new guidelines are likely to have the opposite effect and increase public concerns about wireless technology because the guidelines were designed to protect us only from short-term heating (or thermal) effects. The guidelines fail to protect us from non-thermal effects, especially from long-term exposure to wireless radiation because ICNIRP continues to dismiss the many hundreds of peer-reviewed studies that have found biologic and health effects from exposure to low-intensity, radio frequency radiation including many human as well as animal studies."

Also:

January 1, 2020

ICNIRP's Revised RF Exposure Limits Will Ignore Expert Opinions of Most EMF Scientists

According to Eric van Rongen, chairman of the International Commission on Non-ionizing Research Protection (ICNIRP), in August or September the ICNIRP plans to publish its revised guidelines regarding safe human exposure limits to radiofrequency (RF) electromagnetic fields (EMF) (100 kHz - 300 GHz).

On April 17, 2019, Van Rongen made a presentation about the revised guidelines to the French National Frequency Agency. The ICNIRP guidelines will still be based only on thermal or heating effects. The Commission continues to ignore the many hundreds of peer-reviewed studies that have found bioeffects and health effects from exposure to low intensity, non-thermal levels of RF radiation.

Van Rongen made the following claims (see slide 8 of the presentation):

- "No evidence that RF EMF causes such diseases as cancer - Results of NTP, Falcioni studies (animals, lifetime exposure) not convincing (statement on ICNIRP website)

- No evidence that RF EMF impairs health beyond effects that are due to established mechanisms of interaction"

The 13 commissioners of the ICNIRP strongly disagree with more than 240 EMF scientists who signed the International EMF Scientist Appeal. These scientists who have published over 2,000 papers in professional journals on EMF and biology or health stated:

"The various agencies setting safety standards have failed to impose sufficient guidelines to protect the general public, particularly children who are more vulnerable to the effects of EMF. The International Commission on Non-Ionizing Radiation Protection (ICNIRP) established in 1998 the “Guidelines For Limiting Exposure To Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)” . These guidelines are accepted by the WHO and numerous countries around the world. The WHO is calling for all nations to adopt the ICNIRP guidelines to encourage international harmonization of standards. In 2009, the ICNIRP released a statement saying that it was reaffirming its 1998 guidelines, as in their opinion, the scientific literature published since that time “has provided no evidence of any adverse effects below the basic restrictions and does not necessitate an immediate revision of its guidance on limiting exposure to high frequency electromagnetic fields. ICNIRP continues to the present day to make these assertions, in spite of growing scientific evidence to the contrary. **It is our opinion that, because the ICNIRP guidelines do not cover long-term exposure and low-intensity effects, they are insufficient to protect public health."**

During the public consultation period, about 120 contributors provided the ICNIRP with more than 1,000 comments regarding the draft guidelines.

How many contributors called for RF exposure guidelines that protect humans and other species from health risks due to exposure to low-intensity or non-thermal levels of RF radiation? Did the ICNIRP seriously consider the public input in revising the guidelines? Will the ICNIRP publish these comments?

The slides from the van Rongen presentation (marked "Draft -- Do Not Cite or Quote") are available at: https://www.anfr.fr/fileadmin/mediatheque/documents/expace/workshop-5G/20190417-Workshop-ANFR-ICNIRP-presentation.pdf

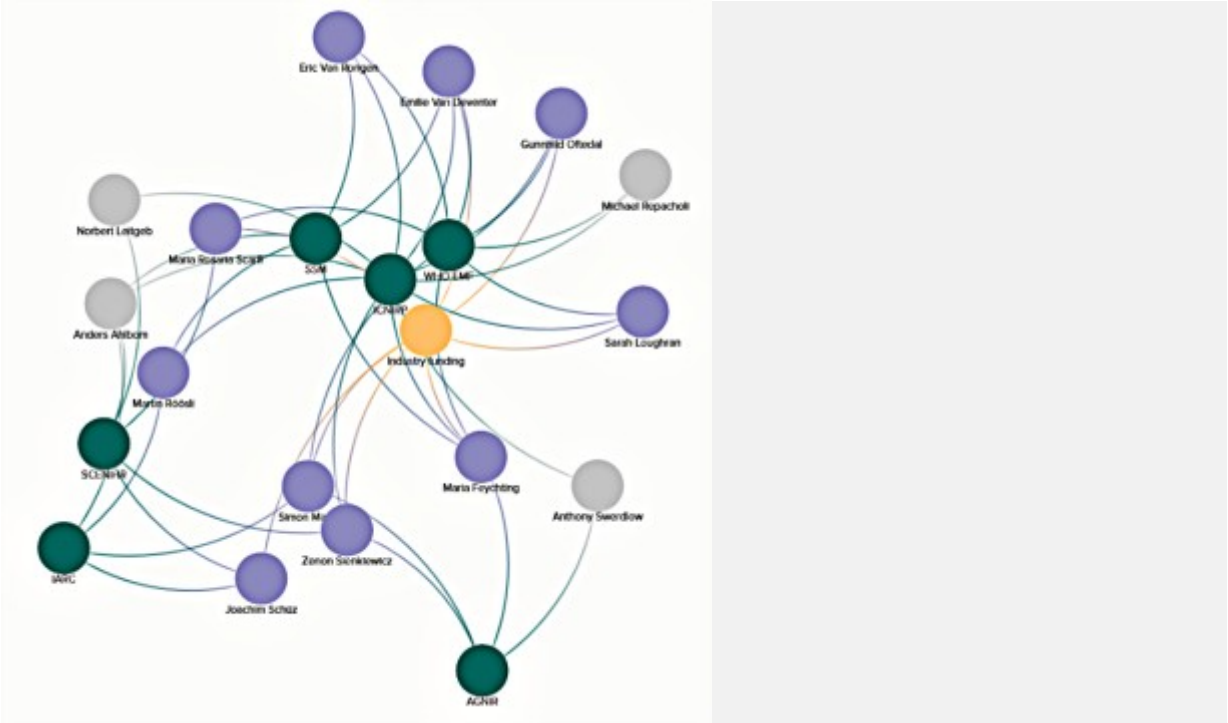
Investigate Europe

The ICNIRP Cartel and the 5G Mass Experiment – March 2019

ICNIRP is a particularly influential group, as it not only evaluates radiation and health risk research, but also provides guidelines for radiation safety limits that most countries use. It is a private, German-registered organisation located outside Munich, behind a yellow door on the premises of the German Federal office for radiation protection. Decisions on who to invite in, are taken by ICNIRP itself.

“ICNIRP does not have an open process for the election of its new members. It is a self-perpetuating group with no dissent allowed. Why is this not problematic?” asks Louis Slesin, editor of the publication Microwave News in New York. He has followed the scientific debate on radiation and health for decades.

There are not enough highly qualified scientists, explains Mike Repacholi, an EMF research pioneer who founded ICNIRP in 1992, to Investigate Europe. The excluded research often does not meet high standards, adds Eric van Rongen, head of ICNIRP. “We are not against including scientists who think differently. But they must fill the profile in a specific vacant position and cannot just be taken in for their dissident views”, says van Rongen.



Click to go to the animated version

Major overlap of scientists

ICNIRP is the de facto standard-setter of radiation safety limits in much of Europe. Still, it is just one out of several scientific groups. The groups, however, are to a remarkable degree staffed by the same experts.

Of 13 ICNIRP scientists, six are members of at least one other committee. In the WHO group, this applies for six out of seven. Every third researcher in the EU commission that gave radiation advice in 2015 was represented in other groups.

This is not so strange, according to Gunnhild Oftedal. She is a member of both the ICNIRP commission and WHO's research group. "People who demonstrate that they are skilled are asked to contribute. Look at who sits on boards and councils in general, this is what it is like everywhere in society", she says.

The committees agree on a basic premise between themselves: The only documented health risk from mobile radiation is the heating of body tissue. The radiation safety limits are set to prevent this from happening. As long as one adheres to these, there is no health risk, according to all but one committee.

For most mobile users it is easy to stay safe in relation to these limits: They are only reached or exceeded by standing directly in front of a base station at a shorter distance than 10 meters.

Are not nearly five billion mobile users worldwide proof that this works well?

Many studies find risk

No, argue a significant number of scientists who believe that people may be harmed by being exposed to mobile radiation far below these limits, especially in the course of many years of use. Oceania Radiofrequency Scientific Advisory Organisation, an Australian entity, examined 2266 studies and found "significant biological effects or health effects" in 68 percent of them. Another, the "Bioinitiative Group", referred to up to 1800 studies when they concluded that many such bio-effects probably cause health damage if people are exposed for a long time. This is because the radiation interferes with normal processes in the body, preventing them from repairing damaged DNA and creating an imbalance in the immune system, say these scientists.

According to the report produced by the Bioinitiative Group, the list of possible damage is frightening: Poor sperm quality, autism, alzheimers, brain cancer and childhood leukemia.

[….]

Source of finance may affect result

At least three studies over the years have documented that there is often a link between conclusions of studies and the source of the money that paid for the research. Science funded by industry is less likely to find health risks than studies paid for by institutions or authorities.

Research money often goes to universities and has "firewalls" between the individual scientist and the money, says Lennart Hardell, cancer doctor and scientist at the University hospital in

Örebro in Sweden. “The problem is, however, that one becomes dependent on this money. Most people do not bite the hand that feeds them”, believes the Swedish researcher.

Hardell studies connections between long-term mobile use and brain cancer and has concluded that one can cause the other. He sat on the IARC committee in 2011, but is not represented on other committees. According to Hardell, his research is funded through his salary from the hospital as well as by funds raised by local cancer foundations and national organisations. “Of course I have also worked a lot on my free time”, he says.

Martin Röösli co-authored one of the studies that documented the link between financing source and results. The associate professor at the Swiss Tropical and Public Health Institute is a member of ICNIRP and other advisory bodies. “Studies which are solely financed by industry are likely to be biased”, Röösli confirms to Investigate Europe. But in his study, mixed financial models with proper firewalls did not result in biased research outcomes – and it had a higher quality. There might also be preferred outcomes in any camp, Röösli asserts: “Researchers may create uncertainties to raise funding for their research”.

Some studies can go on for 15 to 20 years. Such projects are bread and butter for researchers, argues Louis Slesin. Some studies are industry-funded. “Does this constitute a conflict of interest for the scientists involved?” Slesin asks – and answers: “Of course it does”.

Gunnhild Oftedal does not dismiss that the source of funding can affect conclusions – just as “a strong belief that one will find something” can. Such mechanisms were not much considered before. “But today we are concerned about it. I have the impression that scientists are much more cautious about receiving support from the industry – at least direct support”, says Oftedal.

“Industry should pay”

Not everyone wants to denounce money from business. Industry should definitely pay for research into potential dangers of their products; but it should only be conducted independently of the funders, thinks Zenon Sienkiewicz, a UK physiologist, He is part of the ICNIRP commission and has previously been on other advisory bodies.

Research is critically dependent on external funding, adds former ICNIRP scientist Norbert Leitgeb, professor at the Institute of Health Care Engineering at the Graz University of Technology in Austria. “The question is not whether industry has provided money, which it should do if the products are the reason of concern. The important issue is whether there are efficient firewalls established assuring that stakeholders cannot interfere with researchers and influence scientific outcome or conclusions”, he says.

New, stricter rules

The debate of a potential industry bias ignores potential bias from NGOs and private pressure groups, asserts Leitgeb. “Groups such as people with self-declared electromagnetic hypersensitivity would merit the same attention”.

Mike Repacholi founded ICNIRP as well as the WHO EMF project. In the beginning, the WHO project received substantial funding from industry. Upon leaving WHO, Repacholi became an industry consultant.

“There has been such criticism of industry-funded research that the industry now doesn’t fund research. Yet they are the ones causing the concerns about health. Who has lost from this situation?” Repacholi asks.

Nevertheless, both ICNIRP and WHO now exclude researchers who have received support from industry over the past three years.

WHO and the tobacco heritage

Both Eric van Rongen and Gunnhild Oftedal are also deeply into the work of the World Health Organization to update this entity’s knowledge of radiation and health.

The WHO “core” group of scientist has been working since 2012, and the work was initially expected to be completed a long time ago. But allegations of one-sidedness have also ravaged this committee. Now the WHO will put together a larger research group that will evaluate the work of the core group. Participants are not yet appointed, but will include “a broad spectrum of opinions and expertise,” a WHO spokesperson assures Investigate Europe.

Many critics of the dominant EMF research bodies and its historical ties to industry compare the situation with the way tobacco manufacturers were able to maintain doubt about whether smoking was dangerous. “I don’t like that comparison, because there, the harmful effects are clear, whereas with EMF we are still guessing how big or small the problem is”, says Louis Slesin.

The lesson to be learned from the tobacco issue, he thinks, is to be careful not to give too much access and influence to industry. “In 2000, WHO published a major mea culpa report on how it allowed the tobacco industry to influence its thinking. But then they repeated that with EMF. They have never given me an answer to why”, says Slesin.

Michael Bevington – Trustee of ES-UK

The draft ICNIRP guidelines are unscientific, according to the majority-viewpoint scientists - eg International EMF Scientist Appeal, The EMF Call, etc, and the ICNIRP draft guidelines are highly irresponsible if they attempt to deceive unaware members of the public that they protect all human health as opposed to short-term and heating effects only.

They are not protective of human health since they omit most serious adverse effects of RFR, such as effects proven beyond reasonable doubt such as electrosensitivity, cancer, infertility, neurological and cardiovascular harm. This is because they still rely on Schwan's mistake of 1953 that the only adverse effect is heating, when it has been proved many times that this is incorrect.

I believe it is said that 5G cannot work with current short-term heating limits. That is why ICNIRP is thinking of raising them - which implies that their previous guidelines were wrong. The 5G handsets will apparently need automatic cut-offs if part of the body is close to the handset antenna in line with the mast.

Where two or more 5G beams intersect it is likely that that even old ICNIRP guidelines will be exceeded. It is, of course, almost impossible to predict how many times per call this may happen or where.

If you look at van Rongen's attempt to distinguish parts of the body into two types of tissue (page 13) you can see how absurd the thermal paradigm is. Biological cells communicate not by heat or lack of it but by EM signals etc. Parts of the eye appear in both groups of tissue - as if the radiation knows which part it is allowed to attack if it is to be compliant with ICNIRP guidelines. It's been known since 1948 that RFR can cause cataracts etc. What happens if your eye is at the intersection point of several 5G beams or you wear glasses, which can increase the radiation, or you look into the beam from a mobile phone or the antenna on a lamp post, or you sleep in the line of a beam between a mobile and a mast, or if you are more vulnerable as a child, elderly etc?

The invalidated thermal hypothesis also relies on assuming a linear response between RFR and effects, when it has been proved beyond reasonable doubt that this is wrong and that there are 'windows' of effects. Raising the limits for higher frequencies is reckless, unscientific and irresponsible, unless there is proof that they are safe, which there is not.

10,000,000 uW/m2 tends to refer to the IEEE baseline for defining heating SAR.

9,200,000 " refers to ICNIRP for 1.8 GHz.

4,500,000 " refers to ICNIRP for 800/900 MHz.

I wrote to the ICNIRP in 2018 saying that their draft guidelines should be clearly labelled as for short-term and heating effects only. Their chair van Rongen has stated that people should be able to choose between ICNIRP short-term heating guidelines and long-term ones, so it is important that they label their guidelines correctly.

http://www.es-uk.info/wp-content/uploads/2018/11/ES-UK-submission-on-ICNIRP_RF_draft-Oct.2018.pdf

See also Prof Pall on the draft ICNIRP:

https://www.stopumts.nl/doc.php/Artikelen/11684/prof._pall_s_response_to_2018_icnirp_draft_statement_with_appendices

and Hardell on the WHO's refusal to address the science properly:

https://www.spandidos-publications.com/10.3892/ijo.2017.4046

Michael Bevington

It seems that in recent years the UK government and some other groups like ICNIRP and WHO decide the outcome they want, such as wireless and 5G with no proper safety precautions, and then find that they have to deny all scientific evidence contrary to their viewpoint.

In other words, government is driven by politics and votes, not science - eg as regards fracking, where the science has not changed since it has always been known to have

significant risks, suddenly for political reasons it has been banned by Johnson who was formerly in favour of fracking, “unless and until further evidence is provided that it can be carried out safely” (Emily Gosden: “Boris Johnson to ban fracking” Times, November 2 2019).

The WHO of course, which validates ICNIRP, is not primarily dedicated to health in the area of radiation, since it has been legally subservient to the IAEA since 1959, takes its orders from the UN and ITU (see eg: https://www.itu.int/en/ITU-D/Study-Groups/2018-2021/Pages/meetings/session-Q7-2-oct18.aspx), and has a trained electrical engineer in charge of EM health matters, not a doctor experience in electrosensitivity. It is odd it still retains the word 'health' in its title, given that it seems that it was also guilty of covert sterilisation in Kenya (https://www.naturalnews.com/2017-11-10-bombshell-science-paper-documents-the-depopulation-chemical-covertly-spiked-into-vaccines.html).

Sir William Stewart, a former government chief scientific adviser, was allegedly carpeted at no. 10 and then removed as chair of the HPA/PHE after he said on the BBC1 Panorama programme in 2007 that it was timely to assess the health risks of Wifi. Within a year or so of stating that she was electrosensitive and this was an issue, Dr Gro Brunt Harlem was replaced as director general of the WHO. When the US EPA in 1990 recommended that ELF EMFs should be categorised as the equivalent of a 2A carcinogen, the White House allegedly insisted that this was down-graded to 2B (See Jerry Flynn, 2013: Microwave Radiation - A Ticking Time Bomb! Ignorant and Corrupt Governments Endorse Industry’s Irradiation of an Innocent and Defenseless Public: https://www.mast-victims.org/resources/docs/weigel/1/flunn2.pdf) As I understand it, no paid research scientist in the UK these days is allowed to speak out on the dangers of RFR - it is written into their employment contracts, and the military, who are also fully aware of the risks since most warfare is now electronic, hide behind the official secrets act. In recent years government employees were not allowed to admit publicly to non-thermal effects; I guess that this has not changed in practice.

So it is unlikely that the UK's chief medical officer or chief scientific adviser will be allowed to express even a hint of the real scientific evidence against RFR and 5G. If you look at who speaks out over RFR it is mainly retired experts who no longer fear loosing their jobs, except for a very few brave honest scientists who loose promotion (e.g. xxx I heard of recently) or jobs, are put on trumped up disciplinary charges (eg Austria over DNA damage, now proved again by the NTP), suffer attempts on their lives (eg xxx and xxx), or forced to emigrate (eg Montagnier, a nobel prize winner!), etc. It is interesting that the risks which some of the honest scientists suffer are similar to the suffering of some people who are electrosensitive. At present gov still wishes to deny the existence of, or suppress, the voices and scientific evidence of both groups.

As often in the UK, government can be corrupt when it comes to some aspects of scientific honesty, putting its dependence on votes, foreign alliances and security before scientific integrity. I was told yesterday that in the last war the gov developed the partial myth that eating carrots helped the RAF pilots see enemy planes at night, to hide the use of airborne radar, even thought they also knew that the enemy knew about the radar because it was on crashed aircraft. The UK gov's attitude to compulsory sugar taxes, vaping and air particulates, like smoking in the 1950s, has some similarities to its free-for-all or pass-the-buck approach to RFR. Both the government groups on ionising and non-ionising radiation, COMARE (1985 on) and AGNIR (1990-2017), run by NRPB/HPA/PHE were effectively 'fronts' to hide the real scientific evidence, just like some official enquiries on issues about which gov is sensitive.

I therefore feel that the best way of raising awareness is, say, a legal challenge over whether the gov has undertaken proper risk or environmental assessments. Clearly they have not, otherwise they would have banned current high RFR levels as well as fracking.

Investigate Europe

https://www.investigate-europe.eu/en/2019/how-much-is-safe/?portfolioCats=55%2C54

The standard setter "serves industry"

ICNIRP is at the centre of the clash of opinions between scientists. Dutch biologist Eric van Rongen does not dismiss that mobile radiation has effects below the recommended radiation safety guidelines. "But we are not convinced that these effects are harmful to health," he tells Investigate Europe.

ICNIRP is in the process of publishing updated EMF radiation limits. The old ones are from 1998. Little indicates that scientists who sound the alarm have influenced the new guidelines.

The conflicts in EMF research have long roots. Historically, science in this field has been associated with the telecom sector and the military. ICNIRP's safety limits primarily take into account the needs of the telecom industry, claims Dariusz Leszczynski, former long-time researcher at the Finnish radiation protection agency. In 2011, he sat on the committee of IARC, the cancer body of the World Health Organisation, when it decided that EMF is "possibly carcinogenic" to humans. Leszczynski is not represented in ICNIRP nor in other leading expert groups.

"ICNIRP's goal is to set safety limits that do not kill people, while technology works – so something in between", says Leszczynski.

He is echoed by Louis Slesin, the editor of Microwave News. "There is a lot of politics in deciding what goes into a study and what is left out. For instance, excluding people over the age of 60 from a brain tumour study in Australia that was recently published, does not make any sense", says Slesin, pointing out that most brain tumours appear in older age groups.

This particular study, co-authored by two scientists also represented in ICNIRP, concluded that there can be no link between mobile phones and brain tumours because the incidence of brain cancer in the general population has been stable for years. It sharply contrasts a paper published in England last year that showed more than a doubling of glioblastoma, the most aggressive type of brain tumour, between 1995 and 2015.

Source of finance may affect result

At least three studies over the years have documented that there is often a link between conclusions of studies and the source of the money that paid for the research. Science funded by industry is less likely to find health risks than studies paid for by institutions or authorities.

Research money often goes to universities and has “firewalls” between the individual scientist and the money, says Lennart Hardell, cancer doctor and scientist at the University hospital in Örebro in Sweden. “The problem is, however, that one becomes dependent on this money. Most people do not bite the hand that feeds them”, believes the Swedish researcher.

Hardell studies connections between long-term mobile use and brain cancer and has concluded that one can cause the other. He sat on the IARC committee in 2011, but is not represented on other committees. According to Hardell, his research is funded through his salary from the hospital as well as by funds raised by local cancer foundations and national organisations. “Of course I have also worked a lot on my free time”, he says.

Martin Röösli co-authored one of the studies that documented the link between financing source and results. The associate professor at the Swiss Tropical and Public Health Institute is a member of ICNIRP and other advisory bodies. “Studies which are solely financed by industry are likely to be biased”, Röösli confirms to Investigate Europe. But in his study, mixed financial models with proper firewalls did not result in biased research outcomes – and it had a higher quality. There might also be preferred outcomes in any camp, Röösli asserts: “Researchers may create uncertainties to raise funding for their research”.

Some studies can go on for 15 to 20 years. Such projects are bread and butter for researchers, argues Louis Slesin. Some studies are industry-funded. “Does this constitute a conflict of interest for the scientists involved?” Slesin asks – and answers: “Of course it does”.

Gunnhild Oftedal does not dismiss that the source of funding can affect conclusions – just as “a strong belief that one will find something” can. Such mechanisms were not much considered before. “But today we are concerned about it. I have the impression that scientists are much more cautious about receiving support from the industry – at least direct support”, says Oftedal.

> I would say that there are far more than valid reasons for testing effects of signals in the real world with real infrastructure. In my view they are far more informative than any laboratory model that completely fails to account for all the massive pulsing and spiking of dozens of different interacting RF/EMF sources all at the same time. The

laboratory simulations tell us nothing about what we are being exposed to in the real world and nothing about the health effects produced in the real world. ICNIRP have never proved that such complex forms of exposure would not lead to a thermal increase or not cause cell damage in laboratory conditions because they have never even carried out such experiments. In effect what this means is that ICNIRP are setting safety levels in the real world by reference to an ideologically restrictive thermal laboratory model that is completely disconnected from reality. One wonders then how in the 2018 guidelines cited earlier, that they possibly saw fit to make the outlandish claim that "These thresholds were derived to be **strongly conservative** for **typical exposure situations and populations**." when they have never even studied or don't know what 'typical' real world 'exposure situations' and 'populations' actually consist of as they rule out the relevance of any real world data, measurement or analysis on the basis of demands for a laboratory standard quality of dosimetry?[2]

...

ICNIRP, AGNIR, the HPA, Public Health England and Government were and are not in the business of protecting people, due to economic considerations, they are purely in the business of protecting and advancing the interests of the telecommunications industry and others. Throughout history, GDP and economics have always trumped public health considerations and any negative evidence will continue to be smeared and covered up until such a time as the health crisis will be so advanced that it will become impossible to deny. PHE will continue to be compromised by its history unless a full public enquiry takes place that exposes the extent and machinations of this cover up and that is unlikely to ever take place until it's too late. As usual in such circumstances, no-one will ever be held accountable and responsible. The AGNIR 2012 report has been exposed to be deeply flawed and at the very least should be withdrawn. It is a travesty that PHE carry on referring to it in order to defend their historically compromised position. Indeed given this historical compromise, monitoring and review of human and environmental effects of long term low level microwave exposure should be completely removed from PHE's remit and responsibility and be passed to DEFRA as part of their air quality and pollution responsibilities.

One might naively hope that the World Health Organisation might offer some prospect of an objective view of this potential public health crisis, but unfortunately ICNIRP and AGNIR members have fully infiltrated that organisation also.

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2 How ICNIRP, AGNIR, PHE and a 30 year old political decision created and then covered up a global public health scandal

Table 2: Named contributors to the WHO Environmental Health Criteria Monograph on Radiofrequency Fields [(99), in preparation] and membership of ICNIRP or AGNIR.

Core group	
Feychting M.	Vice-Chair ICNIRP, AGNIR
Mann S.M.	ICNIRP, AGNIR
Oftedal G.	ICNIRP
van Rongen E.	Chair ICNIRP
Scarfi M.R.	
Zmirou D.	
Additional experts	
Aicardi G.	
Challis L.	Formerly AGNIR
Curcio G.	
Hug K.	
Juutilainen J.	ICNIRP
Lagorio S.	
Loughran S.	ICNIRP
Marino C.	ICNIRP
McNamee J.	
Naarala J.	
Peyman A.	AGNIR
Röösli M.	ICNIRP
Rubin G.J.	AGNIR
Schoemaker M.	
Selmaoui B.	
de Sèze R.	ICNIRP
Sienkiewicz Z.J.	ICNIRP, AGNIR
Simko M.	
Vijaylaxmi	
Zeni O.	

The WHO is currently embarking on a mission to 'harmonize' safety standards. Basically this means getting everyone to accept ICNIRP's standards.

With 54 participating countries and 8 international organizations involved in the International EMF Project, it provides a unique opportunity to bring countries together to develop a framework for harmonization of EMF standards and to encourage the development of exposure limits and other control measures that provide the same level of health protection to all people.

https://www.who.int/peh-emf/standards/en/

This can be seen as an attempt to make public high radiation exposure more democratic in the sense that everyone will be routinely exposed to high levels without any reasonable form of restriction.

ICNIRP draft on new radiofrequency guidelines is flawed – "At a meeting in Paris on 17 April 2019 **Eric van Rongen**, the present ICNIRP chairman presented a draft on new ICNIRP guidelines

for radiofrequency radiation (RFR) exposure. The presentation is freely available at the web although labeled as a 'draft – do not cite or quote'.

Most remarkable is that the science on health effects is still based on thermal (heating) effect from RFR just as the evaluations published 1998 and updated in 2009. In the draft only thermal effects are considered for health effects (page 7). Van Rongen states there is 'No evidence that RF-EMF causes such diseases as cancer' (page 8). These comments are based on the power point presentation. However, there is no evidence that non-thermal effects are considered and thus a large majority of scientific evidence on human health effects, not to mention hazards to the environment. Thus the basis for new guidelines is flawed and the whole presentation should be dismissed as scientifically flawed. If this draft represents the final version on ICNIRP guidelines it is time to close down ICNIRP since their evaluation is not based on science but on selective data such as only thermal effects from RFR, see also

www.emfcall.org.

The draft represents a worst-case scenario for public health and represents wishful thinking." Source

November 4, 2019 – Article on Prof. Lennart Hardell's blog:
WHO – ICNIRP and radiofrequency radiation

The close association between WHO and the ICNIRP has been described in a previous article. Unfortunately, this association seems to have prevented actions on health and the environment. ICNIRP is a private NGO based in Germany that acts pro-industry. In fact, exposure to radiofrequency (RF) radiation has increased in the society. Now the fifth generation, 5G, of wireless communication is implemented in spite of potential risks to human health and the environment. Our appeal (www.5gappeal.eu) asking for a moratorium until research on risks have been performed has not had any positive response either from EU or the Nordic countries.Microwave news has now published an update with historical views. It is well worth to read. This information is usually not available to the layman.

January 15, 2020 – Article on Prof. Lennart Hardell's blog: Letter on Expert evaluations on health risks from radiofrequency electromagnetic fields (RF-EMF) and 5G – Article about the fraud of **Martin Röösli**, director BERENIS and member of **ICNIRP**

January 28, 2020 – Article on Prof. Lennart Hardell's blog:
Appeals that matter or not on a moratorium on the deployment of the fifth generation, 5G, for microwave radiation

Excerpt:
"In an appeal sent to the EU in September, 2017 currently >260 scientists and medical doctors requested for a moratorium on the deployment of 5G until the health risks associated with this new technology have been fully investigated by industry-independent scientists. The appeal and four rebuttals to the EU over a period of >2 years, have not achieved any positive response from the EU to date. Unfortunately, decision makers seem to be uninformed or even misinformed about the risks. EU officials rely on the opinions of individuals within the ICNIRP

and the Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR), most of whom have ties to the industry……In this article, the warnings on the health risks associated with RF presented in the 5G appeal and the letters to the EU Health Commissioner since September, 2017 and the authors' rebuttals are summarized. The responses from the EU seem to have thus far prioritized industry profits to the detriment of human health and the environment."

[Note by A.J.: Also Dr. Martin L. Pall has corresponded with EU officials, see the serial EU guidelines are fraudulent, and never got any reply. Also I have corresponded with EU, got reactions, but the last letter, the key letter, written by Wojziech Kalamarz did not offer any answer finally, while I asked for answering 12 questions, created by Dr. Martin L. Pall. The answer of Kalamarz can be found here.]

SCHEDULE 20 – FULL ARTICLE

Date: September 12, 2019Author: Simon Hodges26 Comments

Who are ICNIRP?

The International Committee on Non-Ionising Radiation Protection (ICNIRP) are a private self appointed body or NGO who together with the Advisory Group on Non-ionising Radiation (AGNIR) and Public Health England (PHE), have somehow ended up effectively setting microwave radiation exposure 'safety' standards for the populations of large parts of the world since the 1990s.

In May 2011, Mr Jean Huss from the EU Committee on the Environment, Agriculture and Local and Regional Affairs in a report entitled "The potential dangers of electromagnetic fields and their effect on the environment" made the following statement on the credibility of ICNIRP.

The rapporteur underlines in this context that it is most curious, to say the least, that the applicable official threshold values for limiting the health impact of extremely low frequency electromagnetic fields and high frequency waves were drawn up and proposed to international political institutions (WHO, European Commission, governments) by the ICNIRP, an NGO whose origin and structure are none too clear and which is furthermore suspected of having rather close links with the industries whose expansion is shaped by recommendations for maximum threshold values for the different frequencies of electromagnetic fields.

http://assembly.coe.int/nw/xml/XRef/Xref-XML2HTML-en.asp?fileid=13137

An organisation whose origin and structure is none too clear and which is suspected of having rather too close links with the interests of the industries it notionally 'regulates'. Indeed, how do such bodies mysteriously come about in the first place? NGOs may technically be non-governmental organisations but that doesn't mean that they are necessarily non-political organisations, so called scientific 'objectivity' is always shaped and influenced to some degree by political and economic considerations and NGOs are subject to corporate capture and corruption just as much as a sporting ruling body such as FIFA. How is it that a group of people manage to self appoint themselves as the reliable regulatory body which takes upon itself to decide what is supposedly safe for the rest of us or not?

Was ICNIRP funded, established or captured by the very industries it was designed to 'regulate'? Given the endemic corruption which is the hallmark of Neoliberal deregulation in general one would have to say that in all probability: yes.

Anthony J. Swerdlow, who was the ICNIRP Chair of the standing committee on epidemiology contributed to a paper of 2011 which concluded that " the trend in **the accumulating evidence is increasingly against the hypothesis that mobile phone use can cause brain tumors in adults**". Swerdlow on this occasion, declared in a mere footnote and not any statement of interests or conflict of interests that "A.J.S. holds shares in the telecom companies Cable and Wireless Worldwide and Cable and Wireless Communications. A.J.S.'s wife holds shares in the BT group, a global telecommunications services company. " Should the chair of the supposedly 'independent' body setting the guidelines of microwave radiation protection and

also his wife – really be holding shares in the very same companies he is supposed to be regulating? How is this not an extreme conflict of interests?

Why is the origin and structure of ICNIRP so opaque when the decisions it has made have had direct impacts on the health of billions of people? This is something which is far more than 'curious to say the least' and should be a matter of thorough public investigation considering what is at stake in all of this in terms of global public health. Billions of people may well have been adversely effected by the extremist decisions of this self appointed scientific oracle of health and safety to which the whole world seems to have meekly deferred to without asking any real questions.

In terms of its philosophy, it turns out that ICNIRP is something of a closed ideological shop, in that in order to be accepted or invited to become a member of ICNIRP, one is preliminarily required to strictly adhere to the thermal paradigm in terms of radiation health and safety. This paradigm in terms of its followers and their beliefs, asserts that only short term, extremely high exposure to non-ionising microwave radiation that produces a large thermal effect is deemed to be hazardous to human health. Once one adopts that position, then all non-ionising radiation that falls below these levels is automatically and universally assumed to be benign. Once this paradigm is also accepted by government and other bodies such as Public Health England, then the burden falls on those subjected to such now completely unregulated sources of radiation to prove that far lower levels of exposure are indeed harmful, whereas conversely, there is no burden on the industry to irrefutably demonstrate that such exposures are completely and utterly safe. Because in the real world there are no control groups on account of the universal exposure of all the population to such radiation sources then proving irrefutable links between illness and exposure is intensely problematic.

In taking this highly selective approach ICNIRP have effectively inverted the conventions of environmental risk assessments. Don Maisch describes this reversal of principles in the 'Procrustean Approach'.

Risk assessment *for chemicals* ***reversed*** *for non-ionizing electromagnetic radiation*

It is important to note that when it comes to risk assessment that serves as the basis for Western radiofrequency and microwave (RF/MW) standards there is a fundamental departure from conventional risk assessment as used for chemicals. *In their 1995 review of risk assessment of environmental chemicals, Fan, Howd and Davis point out that* ***when assessing human exposure to chemicals, environmental levels are the focus. In other words, protecting the public from toxic effects of chemicals in the environment involves consideration of possible mechanisms of low-level toxicity and likely biological effects at low levels of exposure. In addition, the potential for cumulative (long-term), irreversible effects, such as cancer induction and neurotoxicity, are important considerations.*** *There may be debate over what is the lowest level at which a hazard from a chemical may exist, but calculations are aimed at determining the lowest-dose toxic effects to provide human health protection. The obvious adverse effects from high level exposures are not usually a focus of risk assessment as there is no uncertainty on hazards at high-level exposure.* ***Just the reverse applies to the risk assessment of possible hazards from human exposure to non-ionizing radiation*** *from extremely low frequency (ELF) electromagnetic fields (EMF) to RF/MW electromagnetic radiation (EMR), as examined in this thesis.* ***This thesis explores reasons why a risk assessment paradigm developed in the so-called 'Western world' that only provides protection from obvious adverse effects at***

high-intensity (acute) exposures unlikely to be encountered in the environment. *The possibility of cumulative effects, cancer induction and neurological effects arising from low-intensity exposures that could be encountered in the environment are not a consideration in assessing human health risks [Under ICNIRP's terms]. This has been pointed out in a Swiss government agency publication 'Electrosmog in the Environment' where it is stated "Exposure limit values [in Western standards/guidelines] ensure protection against recognised, acute effects, but they do not protect against suspected effects at lower radiation intensities, especially with long-term exposure".* ***This thesis proposes that such a radical departure from accepted risk assessment practice is based on reasons that primarily are to ensure the continuing development of both corporate and military technology at the expense of public health considerations.*** *This assessment is in agreement with Michaels & Monforton in their observations that* ***both corporate and a revisionist political influence in the risk assessment process has affected the outcome of supposedly scientific risk assessments to marginalize the interests of the public, while at the same time maximizing the influence of the vested interest corporate sector****.*

The Procrustean Approach – Setting Exposure Standards for Telecommunications Frequency Electromagnetic Radiation

This short term exposure paradigm is ridiculous. It can take decades of smoking to develop lung cancer not just the 6 minutes it might take to smoke a cigarette. It can take many years to develop simple allergies from environmental exposure to certain substances or foods. In the case of all the various symptoms and illnesses that can result from exposure to low level microwave radiation, there is an incubation period from 8 to 30 years before we start to see epidemiological evidence of such effects. We are only now starting to see these effects emerging at greater scale as over 2000 peer reviewed small scale health studies have shown, unfortunately there is no global epidemiological system in place that would enable us to gather and collate all the relevant information already being provided by patients around the world in order to get a full picture of the scale of public health effects from extremely long term, low level microwave radiation exposures of all types. It is a mistake to be making small or selective 'studies' as such, as with an appropriate system we could collect the data about symptoms and detailed information about patient's environments being presented on a daily basis and map them globally. **It is extremely likely that a global public health crisis is silently building in the background and there is no system or alert mechanism in place to give us clear warnings as to the scale of what is actually taking place. This is deeply concerning. The proliferation of microwave wireless technology is the largest unregulated, blind technological experiment to have ever taken place on the human race: which has and is, effecting billions of people.**

In response to this growing public health crisis, in direct contrast to ICNIRP's thermally based denial paradigm, in 2007 the BioInitiative Report was put forward with a completely different biologically based paradigm presented as a "Rationale for Biologically-based Exposure Standards for Low-Intensity Electromagnetic Radiation". This paradigm asserts that in terms of very long term exposure, non-ionising microwave radiation of low power density can have strong effects on the human body and the general environment. The two different paradigms lead to remarkably different views as to what constitutes radiation safety levels. The BioInitiative Report of 2012 recommends a maximum exposure of just 5 microwatts per metre squared (5μW/m2) whereas ICNIRP suggest a base line maximum of ten million microwatts per metre squared (10,000,000μW/m2).

One of the biggest problems in researching this subject is trying to get some coherent point of reference in order to understand what kind of exposure levels could properly considered to be safe? The range of guidance is quite simply extraordinary and ranges from the Salzburg 2002 recommendation of a maximum indoor home exposure of 1 micro-watt per meter squared to ICNIRP's 10,000,000 micro-watts per metre squared. How is it possible for different countries or bodies to have 'standards' that vary by a magnitude of 10 million?

The ICNIRP guide for safety standards in wireless communications state that a maximum power density of 10 W/m2 or 10,000 mW/m2 is presented as being a very 'conservative' limit. The FCC in the US has the same limits of 1mW/cm2. Confusingly, the US power density is expressed in mW/cm2 as opposed to ICNIRP's and European use of mW/m2. 1mW/cm2 is equal to 10,000mW/m2 which is precisely the same as ICNIRP's levels and the same is true for US occupational levels: 5mW/cm2 = 50 Watts per meter squared.

To most of us, these figures are not in anyway comprehensible. How do we even begin to imagine or understand their meaning in terms of what we should consider to be a public health threat? Are they too low, too high or just about right? ICNIRP would like us all to believe that they are incredibly conservative. If one reads all of ICNIRP's guidelines issued and even their latest draft guidelines issued in 2018 one is struck by the rhetorical devices of 'conservatism' that are consistently deployed throughout the texts. In the latest draft we find the word 'conservative', strongly conservative etc. is applied no less than 25 times. Below are 6 examples of this device in action in the first 3 pages of the 25 page draft 2018 guidelines. Note that the term 'precautionary' is also thrown in twice in a supporting role for good rhetorical measure.

*These thresholds were derived to be **strongly conservative** for typical exposure situations and populations…Reduction factors account for biological variability in the population, variance in baseline conditions (e.g. tissue temperature), variance in environmental factors (e.g. air temperature, clothing), dosimetric uncertainty associated with deriving exposure values, uncertainty associated with the health science, and as **a conservative measure more generally**…. **As a conservative step**, reference levels have been derived...**ICNIRP adopts a conservative approach to each of these steps in order to ensure that its limits would remain protective <u>even if exceeded by a substantial margin</u>**…… The degree of **precaution** in the exposure levels is thus greater than may be suggested by considering only the reduction factors, which represent only one **conservative** element of the guidelines. ICNIRP considers that the derivation of limits is sufficiently **conservative** to make additional **precautionary** measures unnecessary.*

https://www.icnirp.org/cms/upload/consultation_upload/ICNIRP_RF_Guidelines_PCD_2018_07_11.pdf

In the absence of any general agreement as to what either 'precautionary' or 'conservative' might actually mean within the laboratorial confines and politics of ICNIRP's text and also in real terms in the real world, I suggest that we entirely bracket this rather overly extensively applied language and suspend its influence on our comprehension. For the moment we should just dwell of the extreme nature of its over use in the text. I will be over using it myself as an ironic and sarcastic counter-point to illustrate the pervasiveness and effectiveness of such rhetorical devices in any given text and also consistently place them in inverted commas as a constant reminder of the misleading nature of such devices and the misleading

perceptions they are designed to engender in any given reader not familiar with such techniques.

A real world referential framework to understand safety limits

In this article I propose to try and understand these frequently so called ‘conservative’ safety limits from a different perspective. In order to do this I am going to take the results of a survey carried out in Sweden on an apartment within very close proximity to a GSM/3G/4G LTE base station and then extrapolate from that survey’s results what kind of cell tower or base station infrastructure would actually be required to breach ICNIRP’s ‘conservative’ limit. I should stress here that I am predominantly concentrating on power density radiation exposure related to base stations and cell towers and not ‘Specific Absorption Rates’ (SARs) related to specific personal mobile phone use. One can keep a mobile phone in airplane mode most of the time or use a shielded case and always use it on speaker phone keeping a safe distance. The user is potentially sovereign over their potential radiation exposure risks in such cases whereas with respect to base stations and cell towers they are not. In the UK if someone wants to erect such infrastructure 10 metres from your windows or balcony there is nothing whatsoever that you can effectively do about it other than move house. In the UK you would have to hope that such infrastructure breached planning regulations in that it would have to breach ICNIRP’s limits. In this case study, we are about to see what the chances of such a breach occurring actually are. It should also be noted that in the case below: legally, under current laws, no planning permission would be required to install such infrastructure in the UK anyway, just the permission or co-operation of the owner of the building next door. Only masts that exceed 15 metres in height require planning permission.

The survey took place in 2017 at Östermalm in Stockholm at a 6th floor apartment that had a GSM/3G/4G LTE base station just 12 metres away. The photograph below was taken on the balcony outside the living room.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5920374/

Looking at that apartment and infrastructure, I would certainly not want to live there and one might be surprised that considering ICNIRP's such 'conservative' limits that the network operator was given planning permission to site a base station at such close range and within direct line of sight of such a living space. From a layperson's perspective one might guess that apartment to be getting close to at least 98% of what ICNIRP deems to be a very 'conservative' safe public exposure limit or even suppose that it might be exceeding the limit? One would hope in these circumstances that the occupants might be able to complain about the siting of such infrastructure.

We have all seen such equipment and seeing that physical infrastructure in that location gives us a reasonable grasp of the power densities produced by such equipment at very, very close range. Over the 83 hour survey of the apartment, the average power density recorded at the property was just 3.8mW/m2 or 3.8 milliwatts per square metre. Italy has a maximum exposure level of 1mW/m2 so if that apartment were in Italy, that particular apartment would be just 3.8 times the limit. As the Italian limit is one ten thousandth of the ICNIRP limit, then the Italian limit which one may have assumed to be very conservative in relation to ICNIRP's

levels, is not particularly conservative as the apartment surveyed is only exceeding the Italian limit by a factor of just under four. It seems to me that as a starting point in terms of public health and safety, a strict legal limit of 1mW/m2 is far more appropriate and one would hope that such a base station would not have been allowed to be installed at that location. 1mW/m2 is still far too high in terms of safety limits in comparison with the 0.005mW/m2 suggested by the BioInitiative 2012 report.

In contrast to Italy's 1mW/m2, the ICNIRP 'conservative' safety limit is a massive 10,000 mW/m2 or 10 Watts per square metre as is the US FCC limit and these have to be an average taken over 6 or 30 minutes respectively and are not based upon any peak reading. So this apartment which is within just 12 metres line of sight communication with a medium sized base station is only a minuscule 0.038% of the way to breaching ICNIRP's self proclaimed 'conservative' safety standards.

One wonders what kind of infrastructure would it actually take to beach ICNIRP's standards? If we take 10,000 mW/m2 and divide by the recorded average of 3.8mW/m2 we get a result that in principle you could surround the apartment surveyed with 2,632 such base stations before you would get to ICNIRP's supposed 'precautionary' and 'conservative' safety limit.

In terms of cell tower and base station infrastructure, we can say that even using the higher 0.038% Stockholm figure, it would be impossible to actually get to ICNIRP's limits even if it were physically possible to install 2,632 base stations around the apartment because the power density of the radiation emitted is not a constant source but is dependent on the network usage by all the devices in the surrounding area. To replicate the same flow of data and traffic and hence power density, one would also need 2,632 times the amount of people and devices on the network which is similarly impossible. In which case we would have to take the minimum reading of all frequencies measured in the apartment of 15μW/m2 as a base line (15μW or micro-watts, 1 milliwatt = 1000 micro-watts). In terms of base stations alone: one would require something in the order of 666,000 base stations before one approached the ludicrous target of ICNIRP's 'safety' limits. If a base station even cost as little as £20,000 such an experiment would cost no less than £13.3 billion to conduct so we can safely assume that no-one is ever going to carry it out even if it were physically and practically possible. **Bear in mind that these are just ICNIRP's base limits and they see room for them to be exceeded by a substantial margin** and maintain that even in that instance they would still not constitute any threat to public health!

Microwave Radiation Safety Levels in the UK do not exist as such

In terms of a 'safety' level ICNIRP's are impossible to breach practically in the real world.

In practice, in much of Europe and the US, there are no real restrictions at all on the levels of radiation that we can be exposed to and the telecommunications industry has carte blanche as to the kind of infrastructure it could install in principle anywhere. In many senses one can see ICNIRP's mock limits as yet another example of effective Neoliberal deregulation which directly compromises human and environmental health & safety.

No-one has erected 666,000 cell towers or base stations within the grounds of a school, but in terms of ICNIRP's risible safety limits there would be absolutely nothing to stop someone doing it in principle as they would never breach the limit in practice. Does anyone really see the precautionary placement of 666,000 base stations within a school's grounds as being consistent with a 'conservative' base safety level with room for substantial levels above that?

Under ICNIRPs guidelines, in practice there are no limits whatsoever as to the kind of infrastructure that could be put in place. The only reason that masts and base stations are limited in the power density they output at all is purely a question of economics as the mobile network operators want them to function at the lowest cost to efficiency in terms of power consumption and it has nothing to do with ICNIRP's ridiculous 'standards'. In reality there are effectively no safety standards when it comes to wireless radiation safety and the only reasons we are 'protected' at all is due to economic cost controls, physical, aesthetic and practical restrictions and likely some self imposed safety restraint from the Mobile Network Operators (MNOs) who are obviously wary of being sued some time in the future. As any kind of 'useful' point of reference: ICNIRP's 'conservative' standards are many thousands of times beyond any even vaguely reasonable limit.

For some additional perspective, in order to average 10 Watts per square meter in real world field conditions would require frequent massive spikes and peaks of power density from 40 – 200 W/m2 and higher. ICNIRP state that "For frequencies exceeding 10 MHz (which covers all forms of microwave radiation) it is suggested that the peak equivalent plane wave power density, as averaged over the pulse width does not exceed 1,000 times the Seq restrictions". In this respect peak power density could go as high as 9.9 KW/m2 and still remain within the safety 'guidance'. As far as the biological effects of microwave radiation exposure are concerned it is the pulsed and extreme variations in strength of power density that are of most concern.

To give an additional perspective on the strength of such power density, 100W/m2 is the lower end of the health & safety power density guidance for a wireless phone charging pad where the energy is only travelling a few millimetres. These levels of power density are simply obscene and would never ever be seen in real world operating conditions.

In 2012, The BioInitiative Report reduced their suggested limit of 2007 from 1mW/m2 to just 5μW/m2 or 5 microwatts per square meter. A mobile phone can function at power density levels as low as 0.00003 μW/m2, so even the seemingly conservative BioInitiative 5μW/m2 recommendation of 2012 is still 166,000 times greater than the basic power density required to make or receive a mobile phone call whilst the ICNIRP limit is a completely staggering 333 billion times greater than these basic functional requirements.

What does this mean in terms of legal objections?

In the UK, Masts up to 15 metres high (49.2 feet or twice the height of an average two story house), are within permitted developments and do not require planning permission. Only masts over 15 metres require planning permission. Small antennas and 'de minimis' developments, base stations etc. do not need full planning permission just a notification to the local authority. Planning permission in the few cases it is required is granted with the proviso that ICNIRP's guidelines are not exceeded. As we have seen this is practically impossible so there could never be any objection on those grounds.

Given that the Stockholm apartment was on only 3.8 times the Italian limit, then unless we demand the right for local authorities to set their own safety standards and local authorities at least apply the Italian guideline of 1mW/m2, then no resident, association or the council itself can object to any infrastructure put in place. The local authority can deny access to its own street furniture and land but cannot stop developments on private land where a MNO is paying rent to have the infrastructure hosted. If anyone puts the Stockholm base station or one even

a thousand times more powerful, within 5 metres of your house and windows then there is nothing you can do about it as although it would breach the Italian levels it will never breach ICNIRP's limits which are 10,000 times higher.

This is Neoliberal deregulation at its very worst. It is undemocratic, unfair and places those unlucky enough to have such infrastructure foisted upon them in immediate danger with no recourse to any legal objections.

Have ICNIRP's limits ever been tested?

A rather fundamental question here is has ICNIRP or anyone else for that matter actually tested any of these exposures in anything even remotely approaching real world conditions? I simply do not see how any such thing could be done in laboratory conditions. Have ICNIRP really done testing with the highly erratic pulsed radiation that one sees in the real world from 20-50 multiple sources all acting at the same time and viciously peaking and falling between 1mW/M2 and up to 10KW/m2 thousands of times a second in order to confirm their safety declarations? I doubt even the software to control 20 to 50 signal generators packed into any given area could cope with simulating the erratic behaviour of thousands and thousands of different devices which determine the power density in real world networking conditions. The Stockholm survey listed no less than 20 different RF sources and that is only limited because the EME-Spy 200 exposimeter they used can only log up to twenty different portions of the spectrum (measurements are given in microwatts m2).

Variable	Mean	Median	Min	Max
FM	38.3	3.4	0.0	3,441.2
TV3	4.7	0.0	0.0	308.4
TETRA I	1.2	0.0	0.0	229.3
TETRA II	0.2	0.0	0.0	33.9
TETRA III	0.1	0.0	0.0	26.5
TV4&5	3.0	0.0	0.0	2,206.2
LTE 800 (DL)	977.5	299.5	1.1	52,526.5
LTE 800 (UL)	0.0	0.0	0.0	2.5
GSM + UMTS 900 (UL)	0.0	0.0	0.0	4.5
GSM + UMTS 900 (DL)	1,236.2	459.0	2.5	44,241.5
GSM 1800 (UL)	0.0	0.0	0.0	7.5
GSM 1800 (DL)	78.9	17.8	0.3	8,442.1
DECT	27.3	5.1	0.0	4,614.8
UMTS 2100 (UL)	0.0	0.0	0.0	5.6
UMTS 2100 (DL)	301.8	92.8	0.2	18,445.0
WIFI 2G	0.0	0.0	0.0	203.5
LTE 2600 (UL)	3.9	0.0	0.0	904.7
LTE 2600 (DL)	1,137.5	70.5	0.5	95,522.5
WIMax	0.0	0.0	0.0	2.7
WIFI 5G	0.1	0.0	0.0	105.0
Total	3,810.8	1,312.9	15.2	112,317.7
Total excluding down link	78.8	27.0	0.0	4,616.2

This aggregation of multiple signals of a dynamic nature with complex interference effects was something that the EU's Policy Department for Economic, Scientific and Quality of Life Policies commented on in April 2019. Bear in mind that this report was prepared by the people responsible for overseeing the roll-out of 5G and was not intended as a critique of 5G technology

The EU Policy report of April, 2019 is below (*5G Deployment State of Play in Europe, USA and Asia - Policy Department for Economic, Scientific and Quality of Life Policies Directorate-General for Internal Policies Authors: Colin BLACKMAN and Simon FORGE PE 631.060 – April 2019. The report was requested by the European Parliament's Committee on Industry, Research and Energy*). Please see pages 11 – 12:

https://www.europarl.europa.eu/RegData/etudes/IDAN/2019/631060/IPOL_IDA(2019)631060_EN.pdf

Significant concern is emerging over the possible impact on health and safety arising from potentially much higher exposure to radiofrequency electromagnetic radiation arising from 5G. Increased exposure may result not only from the use of much higher frequencies in 5G but also from the potential for the aggregation of different signals, their dynamic nature, and the complex interference effects that may result, especially in dense urban areas.

The 5G radio emission fields are quite different to those of previous generations because of their complex beamformed transmissions in both directions – from base station to handset and for the return. ***Although fields are highly focused by beams, they vary rapidly with time and movement and so are unpredictable, as the signal levels and patterns interact as a closed loop system. This has yet to be mapped reliably for real situations, outside the laboratory. One aspect, for example, that is not well understood today is the unpredictable propagation patterns that could result in unacceptable levels of human exposure to electromagnetic radiation.*** *While the International Commission on Non-Ionizing Radiation Protection (ICNIRP) issues guidelines for limiting exposure to electric, magnetic and electromagnetic fields (EMF), and EU member states are subject to Council Recommendation 1999/519/EC which follows ICNIRP guidelines,* ***the problem is that currently it is not possible to accurately simulate or measure 5G emissions in the real world****.*

One can guarantee that none of these things have been taken into account in laboratory conditions and certainly not to the peak power levels that ICNIRP 'conservatively' deems to be safe. ICNIRP's 'safety' standards are simply not fit for any practical purpose. Even the demand for highly accurate and strictly calibrated measuring instruments which need to be re-calibrated every two years is completely meaningless given the insane spread between real world levels and ICNIRP's mockery of a 'conservative' standard.

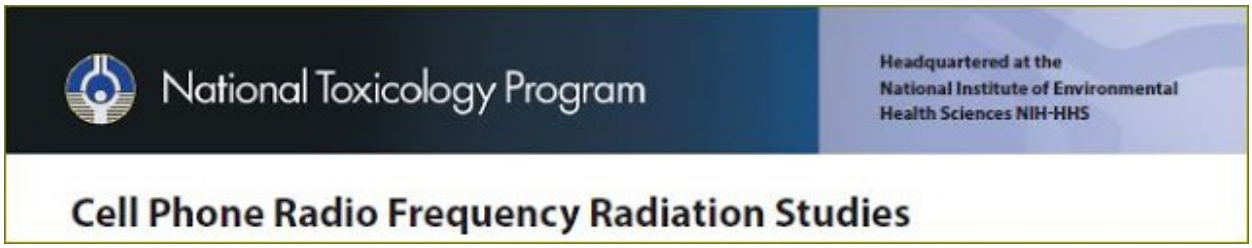
One of the largest issues in all of this is the question as to why Italy only allow a maximum power density of 1mW/m2 but in most of the rest of Europe and the US the threshold level is 10,000 times higher? Italy's mobile telecommunications do not seem to have suffered and are fully functional at that far lower power density: so why do we not all similarly apply such a precautionary standard?

SCHEDULE 21 – US$30M US NATIONAL TOXICOLOGY STUDY

NTP Study
https://www.saferemr.com/2018/11/NTP-final-reports31.html

Wednesday, October 23, 2019

NTP Cell Phone Radiation Study: Final Reports



NTP Study: DNA damage found in rats and mice from 14-19 weeks of exposure to cellphone radiation

Smith-Roe SL, Wyde ME, Stout MD, Winters JW, Hobbs CA, Shepard KG, Green AS, Kissling GE, Shockley KR, Tice RR, Bucher JR, Witt KL. Evaluation of the genotoxicity of cell phone radiofrequency radiation in male and female rats and mice following subchronic exposure. Environ Mol Mutagen. 2019 Oct 21. doi: 10.1002/em.22343.

Abstract

The National Toxicology Program tested two common radiofrequency radiation (RFR) modulations emitted by cellular telephones in a 2-year rodent cancer bioassay that included interim assessments of additional animals for genotoxicity endpoints.

Male and female Hsd:Sprague Dawley SD rats and B6C3F1/N mice were exposed from gestation day 5 or postnatal day 35, respectively, to code division multiple access (CDMA) or global system for mobile (GSM) modulations over 18 hours per day, at 10 minute intervals, in reverberation chambers at specific absorption rates (SAR) of 1.5, 3, or 6 W/kg (Watts/kilogram) (rats, 900 MHz) or 2.5, 5, or 10 W/kg (mice, 1900 MHz). After 19 (rats) or 14 (mice) weeks of exposure, animals were examined for evidence of RFR-associated genotoxicity using two different measures. Using the alkaline (pH > 13) comet assay, DNA damage was assessed in cells from three brain regions, liver cells, and peripheral blood leukocytes; using the micronucleus assay, chromosomal damage was assessed in immature and mature peripheral blood erythrocytes.

Results of the comet assay showed significant increases in DNA damage in the frontal cortex of male mice (both modulations), leukocytes of female mice (CDMA only), and hippocampus of male rats (CDMA only). Increases in DNA damage judged to be equivocal were observed in several other tissues of rats and mice. No significant increases in micronucleated red blood

cells were observed in rats or mice. In conclusion, these results suggest that exposure to RFR is associated with an increase in DNA damage.

https://www.ncbi.nlm.nih.gov/pubmed/31633839

Excerpts

The NTP bioassay was designed to evaluate non-thermal effects of cell phone RFR exposure, which meant that body temperature could not change more than 1 degree Centigrade under our exposure conditions .... Therefore, we consider it unlikely that thermal effects were a confounding factor for our genetic toxicity tests, although more work in general is needed to clarify the thermal effects of RFR on different tissues, and the degree to which increases in body or tissue temperature affect genomic integrity.

... our results and the results of other experiments suggest that non-thermal exposure of cells or whole organisms to RFR may result in measurable genotoxic effects, despite varied and weak responses across studies overall (Brusick et al., 1998; Ruediger, 2009; Verschaeve et al., 2010). Induction of oxygen radicals or interference with DNA repair processes have been proposed as possible mechanisms by which RFR could cause DNA damage (Ruediger 2009; Yakymenko et al. 2015).

... NTP Technical Reports on the results of the 2-year cancer bioassay for exposure to RFR for rats (TR 595) and mice (TR 596) were finalized, peer reviewed, and made publicly available in 2018. The NTP concluded that results demonstrated clear evidence of carcinogenic activity of cell phone RFR (both modulations) based on incidences of malignant schwannomas of the heart in male rats. Malignant gliomas in the brain were also observed in male rats exposed to cell phone RFR and were considered to be related to exposure. Female rats exhibited malignant schwannomas of the heart and malignant gliomas, but incidences of these tumors were considered equivocal. The observation that cell phone RFR affects heart and brain tissue in Sprague Dawley rats after long-term exposure was replicated in a similar study (that used only the GSM modulation) by the Ramazzini Institute (Falcioni et al., 2018). The gliomas and schwannomas observed in rats are similar to the tumor types reported in some epidemiology studies to be associated with cell phone use. The NTP bioassay findings in mice, in which different organs were affected compared to rats, were considered equivocal....

The highest exposure of 6 W/kg in rats and 10 W/kg in mice, for a total of 9 hours 10 minutes a day (achieved by cycling for 10 min on, 10 min off over 18 hours 20 minutes), produced higher exposures than experienced by humans under normal cellular phone use conditions. Thus, whether the findings in the NTP animal studies (e.g. malignant gliomas in the brain and malignant schwannomas in the hearts of male rats; increased levels of DNA damage in hippocampal cells of male rats and the frontal cortex of male mice) indicate a potential for adverse health outcomes in humans remains a question. Because one of the most important questions prompted by our results concerns the mechanism(s) by which RFR might induce biological effects, follow-up studies by the NTP to investigate mechanisms of genetic damage associated with RFR exposure are underway.

The Significance of Primary Tumors in the NTP Study of Chronic Rat Exposure to Cell Phone Radiation

The following paper by Dr. James C. Lin, Professor of Electrical Engineering, Professor of Bioengineering, and Professor of Physiology and Biophysics at the University of Illinois at Chicago, was published in the November issue of the ***IEEE Microwave Magazine***. Dr. Lin was one of the 14 scientists selected by the National Institute of Environmental Health Sciences to perform the expert review of the $30 million cell phone radiation study conducted by the National Toxicology Program. Dr. Lin has received numerous professional awards and honors over the past four decades.

Lin JC. The Significance of Primary Tumors in the NTP Study of Chronic Rat Exposure to Cell Phone Radiation [Health Matters]. IEEE Microwave Magazine. 20(11):18-21. Nov 2019. DOI:10.1109/MMM.2019.2935361.

Abstract

Most media accounts of the U.S. National Toxicology Program's (NTP's) final report have understandably focused on the statistically significant finding of "clear evidence" that both GSM and code-division multiple access (CDMA)-modulated 900-MHz wireless RF radiation led to the development of malignant schwannoma, a rare form of tumor, in the hearts of male rats. In addition to this, unusual patterns of cardiomyopathy, i.e., damage to heart tissue, were observed in both RF-exposed male and female Sprague-Dawley rats compared with concurrent control animals, although the findings for female rats were deemed as providing only uncertain or "equivocal" evidence for schwannomas and malignant gliomas, compared to concurrent controls.

https://ieeexplore.ieee.org/document/8866792

Excerpts

"A Closer Look at the NTP Findings

“In all fairness, the primary cancer or overall cancer rates detected in any organ or tissue inside the animal body do not appear to have been purposefully overlooked or unnoticed. Indeed, the results for total primary cancer or tumor occurrences in NTP animal studies can be found in the appendices of its final reports [1]. However, although the data may not have been purposefully disregarded or ignored, the NTP excluded them from its publicized report summaries. An independent analysis of the data showed that rats exposed to GSM and CDMA RF radiation had significantly higher overall or total primary tumor rates than did the concurrent control rats [4].

In particular, the highest overall cancer (or malignant tumors) rates were found in male rats exposed to whole-body SARs of 3 W/kg from 900-MHz cell phone RF radiation (42 and 46% for GSM and CDMA, respectively), and the lowest rate was found in the concurrent control group (27%). Thus, the RF-exposed groups had significantly higher overall or total primary cancer rates than did the concurrent control rats. Moreover, the highest overall tumor rates

(either a benign or malignant tumor in any organ or tissue) were observed in male rats exposed to SARs of 3-W/kg (87 and 84% for GSM and CDMA, respectively) cell phone RF radiation. As stated previously, the lowest rate was seen in the concurrent control group (63%). The RF-exposed groups had significantly higher overall tumor rates than did the concurrent control rats. Male rats in the lowest RF-exposed groups (whole-body SARs of 1.5 W/kg) had significantly higher rates of benign primary tumors (76 and 73% for GSM and CDMA, respectively) than did concurrent or sham control groups (54%)."

[4] J. Moskowitz, "National toxicology program publishes final cell phone radiation study reports," Electromagn. Radiation Safety, Nov. 2018. [Online]. Available: https://www.saferemr.com/2018/11/NTP-final-reports31.html

"IARC Assessment

The International Agency for Research on Cancer (IARC) assessed the then available scientific literature and concluded that the epidemiological studies on humans that had reported increased risks for malignant gliomas and acoustic neuromas among heavy or long-term users of cell phones were sufficiently strong to support a classification of 2B, i.e., possibly carcinogenic to humans [9]. With its classification of RF radiation as a 2B carcinogen, the IARC suggested that it also believed the available scientific evidence was incomplete and limited, especially with regard to results from animal experiments.

"The time is right for the IARC to upgrade its previous epidemiology-based classification of RF exposure to higher levels in terms of the carcinogenicity of RF radiation for humans. Recently, two relatively well-conducted RF and microwave exposure studies employing the Sprague–Dawley strain of rats—without, however, using any cancer-promoting agents (or cocarcinogens)—showed consistent results in significantly increased total primary cancer or overall tumor rates in animals exposed to RF radiation."

It is important to note that the recent NTP and Ramazzini animal RF exposure studies presented similar findings in heart schwannomas and brain gliomas. The increased schwannomas and abnormal heart tissue development/damage to heart tissue are significant findings in RF-exposed animal research studies. In addition to this, the incidence of benign pheochromocytomas of the adrenal medulla was found to be higher in the exposed group than in the sham controls for the 2,450-MHz circular waveguide experiment [6]. Interestingly, in the recent NTP study, there was "some evidence" of carcinogenicity in the adrenal gland. The number of pheochromocytomas was significantly higher ($p < 0.05$) in male rats at 1.5 and 3 W/kg, compared with the concurrent controls. Moreover, the increase in malignant tumor-like hyperplasia in the adrenal gland of female rats was significantly higher at 6 W/kg, relative to the concurrent controls ($p < 0.05$)."

"Postscripts

... It is important to note that the recent NTP and Ramazzini animal RF exposure studies presented similar findings in heart schwannomas and brain gliomas. The increased schwannomas and abnormal heart tissue development/damage to heart tissue are significant findings in RF-exposed animal research studies....

A particular perspective to keep in mind is that, with the induction of cancer by a carcinogen, an agent is typically considered carcinogenic if it induces a significant response in a specific tissue."

November 1, 2018 (Updated: Nov 16, 2018)

The official summaries of the final reports of the National Toxicology Program (NTP) cell phone radiation studies, the NTP press release, and a new NTP fact sheet can be found below along with the FDA press release that addresses these studies.

In 1999, the U.S. Food and Drug Administration (FDA) asked the NTP to conduct cell phone radiation studies on animals.The FCC's exposure guidelines for cell phone radiation adopted in 1996 and still in effect today were designed to protect humans from thermal (or heating) effects. However, scientists at that time were concerned that low level exposures could increase cancer risk through nonthermal mechanisms. This was the basis for the FDA's request to the NTP in 1999:

"The existing exposure guidelines are based on protection from acute injury from thermal effects of RFR exposure, and may not be protective against any non-thermal effects of chronic exposures. Animal exposure research reported in the literature suggests that low level exposures may increase the risk of cancer by mechanisms yet to be elucidated, but the data is conflicting and most of this research was not conducted with actual cellular phone radiation."

Nineteen years later on November 1, 2018, the NTP published the final reports on the effects of two-years of exposure to 2G (GSM and CDMA) cell phone radiation on rats and mice. Since these studies utilized radiation levels that would not induce significant heating (greater than one degree Centigrade), any observed effects would be due to nonthermal mechanisms (e.g., oxidative stress).

The NTP final reports found "clear evidence" of increased cancer risk in male rats from low level (i.e., nonthermal) exposures (c.f., heart schwannoma). Furthermore, many hundreds of peer-reviewed studies have found evidence of biologic and health effects from low level exposures to cell phone radiation. Hence, the FCC's exposure guidelines must be re-assessed as they are likely inadequate to protect human health.

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Following are my comments about the studies based primarily on the NTP's press release and media teleconference conducted on October 31.

The NTP final reports indicate that the NTP staff has accepted the peer review committee's recommendations about the carcinogenicity of cell phone radiation. A summary of these recommendations can be found at: **http://bit.ly/NTP180330.**

Information about the NTP study and the peer review process is available at:

National Toxicology Program (NTP) Finds Cell Phone Radiation Causes Cancer

National Toxicology Program: Peer & public review of cell phone radiation study reports

Besides "clear evidence" (the highest category) of cancer in male rats from long term exposure to cell phone radiation, the NTP found degeneration in the hearts of male and female rats, decreased birth weights in rats exposed prenatally, and DNA damage in mice and rats as compared to sham controls.

Nonetheless, the NTP seems to be downplaying the significance of the results for public health of their $30 million cell phone radiation studies.

In my opinion, the results of the NTP cell phone radiation studies in conjunction with the results of the recent Ramazzini Institute study provide **conclusive evidence that long term exposure to cell phone radiation causes DNA damage and cancer.**

To follow up on the comments I submitted to the NTP in March, during the telebriefing yesterday, I asked whether the NTP conducted a statistical analysis of the overall tumor rates (across all organs) for each group. Dr. Bucher responded that there is a "philosophical difference" about whether to examine overall tumor risk in toxicology studies because the overall tumor rate is generally "driven by common tumors." Thus, such an analysis is usually overly conservative (i.e., biased toward the null).

However, there is a precedent for conducting such an analysis in the NTP cellphone studies since the entire body of the animals was exposed to cellphone radiation. A 5-year, $5 million Air Force study found low incidences of many types of tumors in male rats exposed to microwave radiation (Chou et al, 1992). In that study, the exposed rats were three times more likely to get cancer than the control rats. The study employed much lower intensity microwave radiation than the NTP studies.

We should learn from our colleagues who study tobacco research. Early toxicology research on the effects of tobacco found low incidences of many types of tumors among animals exposed to tobacco smoke. Scientists dismissed this evidence because they assumed an agent could not cause cancer in different types of tissue. History later proved them wrong.

Dr. Wyde's response to my question was that the overall tumor rates appear in Appendices A through D of the NTP final reports. Unfortunately, these results remain buried in the appendices when in my opinion they should be featured as key results of the study.

The data in the following tables were extracted from Tables A2 and C2 in the NTP final report on the 2-year rat study (pp. 149-150 and 203-204). The tumor rates across all organs for the male rats are tabled by exposure condition for GSM and CDMA cell phone radiation for benign tumors, malignant tumors, and for either type of tumors.

TABLE A2
Statistical Analysis of Primary Neoplasms in Male Rats Exposed to GSM-Modulated Cell Phone RFR for 2 Years

	Sham Control	1.5 W/kg	3 W/kg	6 W/kg

All Organs: Benign Neoplasms				
Overall rate	49/90 (54%)	68/90 (76%)	71/90 (79%)	57/90 (63%)
Rate per litters	26/35 (74%)	33/35 (94%)	35/35 (100%)	32/35 (91%)
Adjusted rate	65.3%	80.3%	83.5%	69.2%
Terminal rate	18/25 (72%)	35/45 (78%)	44/50 (88%)	43/60 (72%)
First incidence (days)	440	309	454	384
Rao-Scott adjusted Poly-3 test	P=0.519	P=0.032	P=0.010	P=0.370
Litter C-A/Fisher's test	P=0.035	P=0.023	P<0.001	P=0.055
All Organs: Malignant Neoplasms				
Overall rate	24/90 (27%)	36/90 (40%)	38/90 (42%)	35/90 (38%)
Rate per litters	18/35 (51%)	24/35 (69%)	25/35 (71%)	26/35 (74%)
Adjusted rate	33.2%	44.9%	45.8%	41.3%
Terminal rate	5/25 (20%)	15/45 (33%)	17/50 (34%)	23/60 (38%)
First incidence (days)	212	291	537	472
Rao-Scott adjusted Poly-3 test	P=0.276	P=0.100	P=0.081	P=0.197
Litter C-A/Fisher's test	P=0.042	P=0.111	P=0.070	P=0.041

All Organs: Benign or Malignant Neoplasms				
Overall rate	57/90 (63%)	73/90 (81%)	78/90 (87%)	71/90 (79%)
Rate per litters	29/35 (83%)	33/35 (94%)	35/35 (100%)	35/35 (100%)
Adjusted rate	72.8%	84.5%	89.3%	83.0%
Terminal rate	20/25 (80%)	36/45 (80%)	44/50 (88%)	50/60 (83%)
First incidence (days)	212	291	454	384
Rao-Scott adjusted Poly-3 test	P=0.108	P=0.061	P=0.009	P=0.096
Litter C-A/Fisher's test	P=0.003	P=0.130	P=0.012	P=0.012

TABLE C2
Statistical Analysis of Primary Neoplasms in Male Rats Exposed to CDMA-Modulated Cell Phone RFR for 2 Years

	Sham Control	1.5 W/kg	3 W/kg	6 W/kg
All Organs: Benign Neoplasms				
Overall rate	49/90 (54%)	66/90 (73%)	69/90 (77%)	49/90 (54%)
Rate per litters	26/35 (74%)	34/35 (97%)	35/35 (100%)	31/35 (89%)
Adjusted rate	65.3%	80.2%	82.3%	66.4%
Terminal rate	18/25 (72%)	37/43 (86%)	50/56 (89%)	28/43 (65%)
First incidence (days)	440	447	383	497
Rao-Scott adjusted Poly-3 test	P=0.422N	P=0.036	P=0.017	P=0.508
Litter C-A/Fisher's test	P=0.108	P=0.007	P<0.001	P=0.109
All Organs: Malignant Neoplasms				
Overall rate	24/90 (27%)	26/90 (29%)	41/90 (46%)	34/90 (38%)
Rate per litters	18/35 (51%)	20/35 (57%)	28/35 (80%)	25/35 (71%)
Adjusted rate	33.2%	34.2%	49.2%	46.1%
Terminal rate	5/25 (20%)	18/43 (42%)	26/56 (46%)	17/43 (40%)
First incidence (days)	212	550	393	153
Rao-Scott adjusted Poly-3 test	P=0.034	P=0.509	P=0.031	P=0.076
Litter C-A/Fisher's test	P=0.030	P=0.405	P=0.011	P=0.070

All Organs: Benign or Malignant Neoplasms				
Overall rate	57/90 (63%)	75/90 (83%)	76/90 (84%)	63/90 (70%)
Rate per litters	29/35 (83%)	35/35 (100%)	35/35 (100%)	33/35 (94%)
Adjusted rate	72.8%	89.2%	88.0%	79.7%
Terminal rate	20/25 (80%)	41/43 (95%)	51/56 (91%)	34/43 (79%)
First incidence (days)	212	447	383	153
Rao-Scott adjusted Poly-3 test	P=0.337	P=0.009	P=0.014	P=0.210
Litter C-A/Fisher's test	P=0.109	P=0.012	P=0.012	P=0.130

(T) Terminal euthanasia

[a] Number of neoplasm-bearing animals/number of animals examined. Denominator is number of animals examined microscopically for adrenal gland, heart, pancreas, pancreatic islets, pituitary gland, prostate gland, and thyroid gland; for other tissues, denominator is number of animals necropsied.

[b] Number of litters with tumor-bearing animals/number of litters examined at site

[c] Poly-3 estimated neoplasm incidence after adjustment for intercurrent mortality

[d] Observed incidence at terminal euthanasia

[e] Beneath the sham control incidence is the P value associated with the trend test. Beneath the exposed group incidence are the P values corresponding to pairwise comparisons between the sham controls and that exposed group. The Poly-3 test accounts for differential mortality in animals that do not reach terminal euthanasia. The Rao-Scott test adjusts the Poly-3 test (which accounts for differential mortality in animals that do not reach terminal euthanasia) for within-litter correlation. A negative trend or a lower incidence in an exposure group is indicated by N.

[f] The Litter Cochran-Armitage and Fishers exact tests directly compare the litter incidence rates.

[g] Not applicable; no neoplasms in animal group

The above tables show that the highest overall tumor rates (i.e., the presence of either a benign or malignant tumor in any organ) were found in male rats exposed to 3 watts per kilogram of either GSM (87%) or CDMA (84%) cell phone radiation, and the lowest rate was found in the sham control group (63%). The exposed groups had significantly higher overall tumor rates than the sham controls even after adjusting for survival differences among the groups (see the Poly-3 test p values).

The highest cancer rates (i.e., malignant tumors) were found in male rats exposed to 3 watts per kilogram of either GSM (42%) or CDMA (46%) cell phone radiation and the lowest rate was found in the sham control group (27%). Here too, the exposed groups had significantly higher overall cancer rates than the sham controls.

Moreover, male rats in the lowest exposure groups (1.5 watts per kilogram) had significantly higher rates of benign tumors (76% for GSM; 73% for CDMA) than the sham control group (54%).

Is it justifiable to bury these results in the appendices to the final reports?

The results of the NTP and Ramazzini Institute studies reaffirm the concerns raised by the scientific community in the **International EMFScientist Appeal** about the harm caused by chronic exposure to low-intensity electromagnetic fields (EMF). The Appeal, which has been signed by more than 240 EMF scientists who have published over 2,000 papers on EMF and biology or health in professional journals, calls for warning the public and strengthening EMF guidelines, especially to protect children and pregnant women.

We are guinea pigs in a massive technological experiment that threatens our health. Our government needs to determine what constitutes a safe level of long-term exposure to wireless radiation and strengthen the FCC's radio frequency exposure guidelines. In the meantime, the government should impose a moratorium on technologies that increase our

exposure to wireless radiation, especially new forms of wireless radiation like 5G cellphone radiation.

Related posts:

National Toxicology Program (NTP) Finds Cell Phone Radiation Causes Cancer

National Toxicology Program: Peer & public review of cell phone radiation study reports

NTP: Not the First Govt. Study to Find Wireless Radiation Can Cause Cancer in Lab Rats
Ramazzini Institute Cell Phone Radiation Study Replicates NTP Study

International EMF Scientist Appeal

Scientists and Doctors Demand Moratorium on 5G
5G Moratorium Website Launched

Cell Tower Health Effects

5G Wireless Technology: Is 5G Harmful to Our Health?
5G Wireless Technology: Millimeter Wave Health Effects

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NTP Final Reports

National Toxicology Program. NTP technical report on the toxicology and carcinogenesis studies in Hsd:Sprague Dawley SD rats exposed to whole-body radio frequency radiation at a frequency (900 MHz) and modulations (GSM and CDMA) used by cell phones. NTP TR 595. Research Triangle Park, NC. November, 2018. https://www.niehs.nih.gov/ntp-temp/tr595_508.pdf

SUMMARY

Background

Cell phones utilize a specific type of radio waves, or radio frequency radiation (RFR), to transmit between the devices and the network. Exposure of people to RFR occurs primarily through use of cell phones and other wireless devices. We studied the effects of nearly lifetime exposures to two different types, or modulations, of RFR (GSM and CDMA) used in cellular telephone networks in the United States in male and female rats and mice to identify potential toxicity or cancer-related hazards.

Over the years, cell phone technology has evolved from the original analog technology (1G) commercially introduced in the 1980s to digital networks that supplanted analog phones. The digital network, referred to as 2G or the 2nd generation of technology, was commercially launched in the 1990s, with 3G and 4G subsequently deployed in the intervening years. When the current studies were being designed, 2G technology was the industry standard, and 3G technologies were under development. While newer technologies have continued to evolve, it is important to note that these technologies have not completely replaced the older technologies. In fact, today's phones are very complex in that they contain several antennas,

for wi-fi, GPS, 2G/3G bands, etc. Thus, the results of these studies remain relevant to current exposures, although the power levels of the exposures were much higher than typical patterns of human use.

Methods

We exposed groups of 90 male and 90 female rats to 1.5, 3, or 6 W/kg RFR that was modulated in the same manner in which signals are emitted from cell phones and other similar wireless communication devices. Other groups of male and female rats housed in the same type of chambers without any exposure to RFR were used as the controls. Animals were exposed to RFR in utero, postnatally, and during adulthood for approximately 9 hours a day, 7 days per week, for 2 years. Tissues from more than 40 sites were examined for every animal.

Results

Exposure to RFR caused decreased body weights of pregnant rats during gestation and lower birth weights in their offspring. However, a few weeks after birth body weights returned to normal and were similar to non-exposed rats. In general, RFR-exposed male rats lived longer than non-exposed rats. The higher survival of exposed males was attributed to a lower severity of a natural, age-related kidney disease typically observed in male rats at the end of these types of studies, which may have been related to the RFR exposure. In both studies (GSM and CDMA), exposure to RFR in male rats resulted in higher numbers of animals with tumors of the heart and brain. In the GSM study, increased numbers of animals with tumors of the adrenal gland were also observed in exposed males. In both studies, there were tumors that occurred in several organs that we were unable to clearly determine whether these resulted from exposure or were just incidental findings. For the GSM studies, these lesions included tumors of the prostate gland, pituitary gland, and pancreas in males and of the heart in females. For the CDMA studies, these equivocal lesions included tumors of the pituitary gland and liver in males and of the heart, brain, and adrenal gland of females.

Conclusions

In males for both GSM- and CDMA-modulated RFR, we conclude that exposures increased the number of animals with tumors in the heart. Tumors of the brain were also considered to be related to exposure; and increased numbers of male rats with tumors of the adrenal gland were also related to exposure. We are uncertain whether occurrences of prostate gland, pituitary gland, and pancreatic islet tumors in male rats exposed to GSM-modulated RFR and pituitary gland and liver tumors in male rats exposed to CDMA-modulated RFR were related to RFR exposures. This was also the case with female rats, where we conclude that exposure to GSM- or CDMA-modulated RFR may have been related to tumors in the heart. For females exposed to CDMA-modulated RFR, occurrences of brain and adrenal gland tumors may have been related to exposure.

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National Toxicology Program. NTP technical report on the toxicology and carcinogenesis studies in B6C3F1/N mice exposed to whole-body radio frequency radiation at a frequency

(1900 MHz) and modulations (GSM and CDMA) used by cell phones. NTP TR 596. Research Triangle Park, NC. November, 2018. https://www.niehs.nih.gov/ntp-temp/tr596_508.pdf

SUMMARY

Background

Cell phones utilize a specific type of radio waves, or radio frequency radiation (RFR), to transmit voice and data between the devices and the network. Exposure of people to RFR occurs primarily through use of cell phones and other wireless devices. We studied the effects of nearly lifetime exposure to two different types, or modulations, of RFR (GSM and CDMA) used in cellular telephone networks in the United States in male and female rats and mice to identify potential toxic or cancer-related hazards.

Over the years, cell phone technology has evolved from the original analog technology (1G) commercially introduced in the 1980s to digital networks that supplanted analog phones. The digital network, referred to as 2G or the 2nd generation of technology, was commercially launched in the 1990s, with 3G and 4G subsequently deployed in the intervening years. When the current studies were being designed, 2G technology was the industry standard, and 3G technologies were under development. While newer technologies have continued to evolve, it is important to note that these technologies have not completely replaced the older technologies. In fact, today's phones are very complex in that they contain several antennas, for Wi-Fi, GPS, 2G/3G bands, etc. The results of these studies remain relevant to current exposures, although the power levels of the exposures were much higher than typical patterns of human use.

Methods

We exposed groups of 90 male and 90 female mice to 2.5, 5, or 10 W/kg RFR that was modulated in the same manner in which signals are emitted from cell phones and other similar wireless communication devices. Other groups of male and female mice housed in the same type of chamber without any exposure to RFR were used as the controls. Animals were exposed to RFR for approximately 9 hours a day, 7 days per week, for 2 years. Tissues from more than 40 sites were examined for every animal.

Results

There were higher rates of survival in males at the low (2.5 W/kg) and mid (5 W/kg) exposures to CDMA- and GSM-modulated RFR, respectively. Body weights in the exposed groups of animals were similar to their controls. In both studies (GSM and CDMA), there were higher incidences of malignant lymphoma in all groups of female mice exposed to RFR compared to controls. However, the incidences in all of the exposed females were within the range historically observed in this strain of mouse in other NTP studies. There were higher incidences of skin and lung tumors in males exposed to the highest two levels of GSM-modulated RFR (5 and 10 W/kg), and of liver tumors at the mid-dose (5 W/kg) of CDMA-modulated RFR.

Conclusions

For GSM-modulated RFR, we conclude that exposure to RFR may have caused tumors in the skin and lungs of male mice and malignant lymphomas in female mice. For CDMA-modulated RFR, we conclude that exposure to RFR may have caused tumors in the liver of male mice and malignant lymphomas in female mice.

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NTP Press Release (November 1, 2018)

High exposure to radio frequency radiation associated with cancer in male rats

National Toxicology Program releases final reports on rat and mouse studies of radio frequency radiation like that used in 2G and 3G cell phone technologies

Press Release, National Toxicology Program, Nov 1, 2018

The National Toxicology Program (NTP) concluded there is clear evidence that male rats exposed to high levels of radio frequency radiation (RFR) like that used in 2G and 3G cell phones developed cancerous heart tumors, according to final reports released today. There was also some evidence of tumors in the brain and adrenal gland of exposed male rats. For female rats, and male and female mice, the evidence was equivocal as to whether cancers observed were associated with exposure to RFR. The final reports represent the consensus of NTP and a panel of external scientific experts who reviewed the studies in March after draft reports were issued in February.

“The exposures used in the studies cannot be compared directly to the exposure that humans experience when using a cell phone,” said John Bucher, Ph.D., NTP senior scientist. “In our studies, rats and mice received radio frequency radiation across their whole bodies. By contrast, people are mostly exposed in specific local tissues close to where they hold the phone. In addition, the exposure levels and durations in our studies were greater than what people experience.”

The lowest exposure level used in the studies was equal to the maximum local tissue exposure currently allowed for cell phone users. This power level rarely occurs with typical cell phone use. The highest exposure level in the studies was four times higher than the maximum power level permitted.

“We believe that the link between radio frequency radiation and tumors in male rats is real, and the external experts agreed,” said Bucher.

The $30 million NTP studies took more than 10 years to complete and are the most comprehensive assessment, to date, of health effects in animals exposed to RFR with modulations used in 2G and 3G cell phones. 2G and 3G networks were standard when the studies were designed and are still used for phone calls and texting.

“A major strength of our studies is that we were able to control exactly how much radio frequency radiation the animals received — something that’s not possible when studying

human cell phone use, which has often relied on questionnaires," said Michael Wyde, Ph.D., lead toxicologist on the studies.

He also noted the unexpected finding of longer lifespans among the exposed male rats. "This may be explained by an observed decrease in chronic kidney problems that are often the cause of death in older rats," Wyde said.

The animals were housed in chambers specifically designed and built for these studies. Exposure to RFR began in the womb for rats and at 5 to 6 weeks old for mice, and continued for up to two years, or most of their natural lifetime. The RFR exposure was intermittent, 10 minutes on and 10 minutes off, totaling about nine hours each day. RFR levels ranged from 1.5-6 watts per kilogram in rats, and 2.5-10 watts per kilogram in mice.

These studies did not investigate the types of RFR used for Wi-Fi or 5G networks.

"5G is an emerging technology that hasn't really been defined yet. From what we currently understand, it likely differs dramatically from what we studied," said Wyde.

For future studies, NTP is building smaller RFR exposure chambers that will make it easier to evaluate newer telecommunications technologies in weeks or months, rather than years. These studies will focus on developing measurable physical indicators, or biomarkers, of potential effects from RFR. These may include changes in metrics like DNA damage in exposed tissues, which can be detected much sooner than cancer.

The U.S. Food and Drug Administration nominated cell phone RFR for study by NTP because of widespread public use of cell phones and limited knowledge about potential health effects from long-term exposure. NTP will provide the results of these studies to FDA and the Federal Communications Commission, who will review the information as they continue to monitor new research on the potential effects of RFR.

NTP uses four **categories** to summarize the evidence that a substance may cause cancer:

- Clear evidence (highest)
- Some evidence
- Equivocal evidence
- No evidence (lowest)

More information on the categories is available at https://ntp.niehs.nih.gov/results/pubs/longterm/defs/index.html

https://www.niehs.nih.gov/news/newsroom/releases/2018/november1/index.cfm

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Transcript of NTP Press Conference, October 31, 2018

https://www.niehs.nih.gov/news/newsroom/releases/2018/november1/11012018transcript_508.pdf

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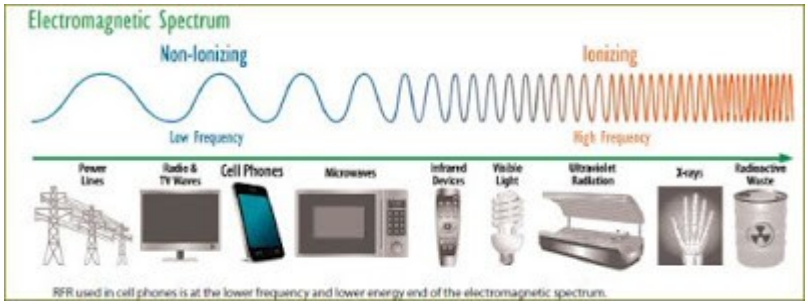
NTP Cell Phone Radiation Fact Sheet (November, 2018)

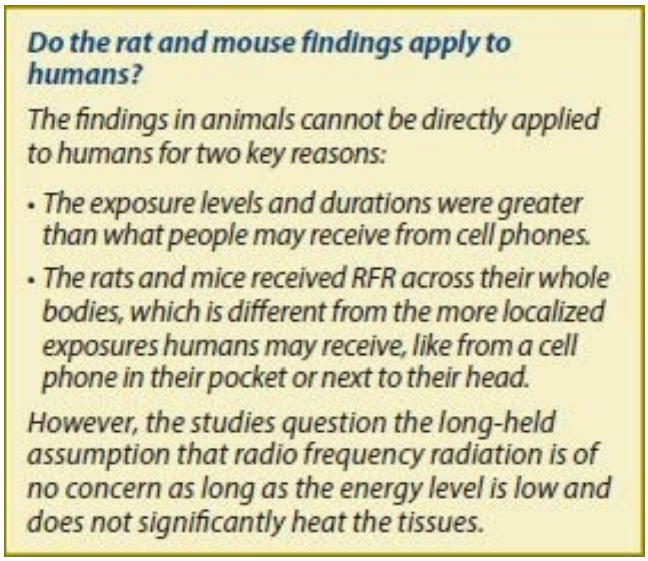


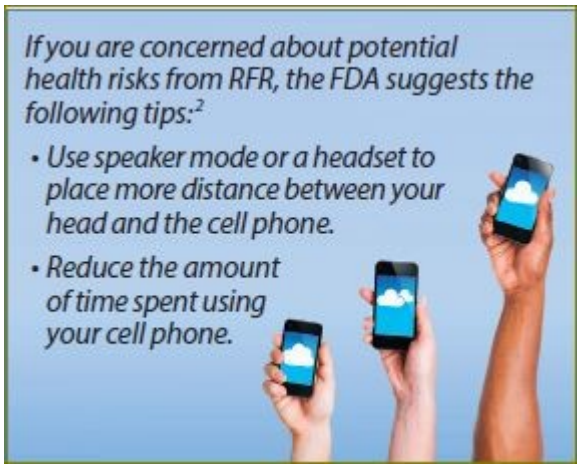
What did the studies find?

NTP studies found that exposure to high levels of RFR, like that used in 2G and 3G cell phones, was associated with:

- **Clear evidence of tumors in the hearts of male rats.** The tumors were malignant schwannomas.
- **Some evidence of tumors in the brains of male rats.** The tumors were malignant gliomas.
- **Some evidence of tumors in the adrenal glands of male rats.** The tumors were pheochromocytomas.

For female rats, and male and female mice, it was unclear, also known as equivocal, whether cancers observed in the studies were associated with exposure to RFR.





https://www.niehs.nih.gov/health/materials/cell_phone_radiofrequency_radiation_studies_508.pdf

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FDA contradicts NTP

According to NTP Report (NTP TR 595, p. 25):

"The FDA does not currently regulate the use of wireless communications devices or the devices themselves. The FDA also does not require safety evaluations for radiation-emitting wireless communication devices. It does maintain the authority to take regulatory action if it is demonstrated that exposure to the emitted cell phone RFR from these devices is hazardous to the user."

Dr. Bucher, an NTP senior scientist and former associate director, stated in the NTP's press release (Nov 1, 2018), "We believe that the link between radio frequency radiation and tumors in male rats is real, and the external experts agreed."

Nonetheless, the FDA dismissed the NTP results in its press release. FDA Center Director, Dr. Shuren, stated "these findings should not be applied to human cell phone usage ... we believe the existing safety limits for cell phones remain acceptable for protecting the public health."

This is rather odd since the FDA requested that the NTP conduct these animals studies in 1999 because the agency was concerned that the FCC's cell phone "safety limits" did not protect human safety since the limits were based on a thermal model. Now that we have hundreds of animal studies demonstrating non-thermal biologic effects and several major epidemiologic studies demonstrating increased cancer risk in heavy cell phone users, FDA should be more concerned than ever that the FCC exposure guidelines are inadequate.

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FDA. Press Release: Statement from Jeffrey Shuren, M.D., J.D., Director of the FDA's Center for Devices and Radiological Health on the National Toxicology Program's report on radiofrequency energy exposure. FDA, Nov 1, 2018.

"We know that cell phones are an important, everyday tool to most Americans. We use them now for much more than just talking—from booking travel on an app to using mobile wallets to pay for groceries. Our ubitquitious use of cell phones inevitably means that we must continue to review and ensure their safety.

The Food and Drug Administration is charged with ensuring cell phones— and any radiation-emitting electronic product—are safe for the public to use. Our scientific expertise and input, along with other health agencies, are used by the Federal Communications Commission (FCC) to set the standards for exposure limits of radiation from cell phones, called radiofrequency energy.

We have relied on decades of research and hundreds of studies to have the most complete evaluation of radiofrequency energy exposure. This information has informed the FDA's assessment of this important public health issue, and given us the confidence that the current safety limits for cell phone radiofrequency energy exposure remain acceptable for protecting the public health.

When new studies or information becomes available, the FDA conducts thorough evaluations of the data to continually inform our thinking. We reviewed the recently finalized research conducted by our colleagues at the National Toxicology Program (NTP), part of the National Institute of Environmental Health Sciences within the National Institutes of Health, on radiofrequency energy exposure. After reviewing the study, we disagree, however, with the conclusions of their final report regarding "clear evidence" of carcinogenic activity in rodents exposed to radiofrequency energy.

In the NTP study, researchers looked at the effects of exposing rodents to extremely high levels of radiofrequency throughout the entire body. This is commonly done in these types of hazard identification studies and means that the study tested levels of radiofrequency energy exposures considerably above the current whole body safety limits for cell phones. Doing this was intended to help contribute to what we already understand about the effects of radiofrequency energy on animal tissue. In fact, we only begin to observe effects to animal tissue at exposures that are 50 times higher than the current whole body safety limits set by the FCC for radiofrequency energy exposure.

Our colleagues at NTP echoed this point in a statement earlier this year about their draft final report, including the important note that "these findings should not be directly extrapolated to human cell phone usage."

We agree that these findings should not be applied to human cell phone usage.

NTP hosted a three-day peer review of this study in March, as part of their normal process for issuing scientific reports. The FDA was not a participant in that process, but was invited to observe the panel discussions, which included an assessment of the study methods and data by a panel of 15 peer reviewers to determine the basis of evidence for the final report. Based on their assessment, the panel voted to upgrade the conclusions from some evidence to clear evidence for malignant heart schwannomas in male rats, and from equivocal (ambigious) to some evidence for malignant gliomas of the brain and benign tumors of the adrenal gland in male rats. It's important to note that the vote does not mean new data or findings were reported in the final assessment.

In addition, as we've noted previously, there were unusual findings in the study, such as: the rats exposed to whole body radiofrequency energy lived longer than rats that were not exposed to any radiation (control group); only male rats exposed to the highest radiofrequency energy dosage developed a statistically significant number of heart schwannomas, which are very rare in humans, when compared to the control group in this experiment. There was also no true dose response, or a lack of a clear relationship between the doses of radiation administered to the animals and their subsequent tumor rate.

Researchers will need to consider all of the findings when exploring future human epidemiological studies.

As scientists, we welcome new studies. Animal studies like this one contribute to our discussions on this topic, but we must remember the study was not designed to test the safety of cell phone use in humans, so we cannot draw conclusions about the risks of cell phone use from it. We also must thoroughly evaluate and take into consideration the totality of the data, and do so within the context of the complete body of evidence rather than drawing conclusions from the results of a single study.

As part of our commitment to protecting the public health, the FDA has reviewed, and will continue to review, many sources of scientific and medical evidence related to the possibility of adverse health effects from radiofrequency energy exposure in both humans and animals and will continue to do so as new scientific data are published.

Based on our ongoing evaluation of this issue, the totality of the available scientific evidence continues to not support adverse health effects in humans caused by exposures at or under the current radiofrequency energy exposure limits. We believe the existing safety limits for cell phones remain acceptable for protecting the public health.

The FDA, an agency within the U.S. Department of Health and Human Services, protects the public health by assuring the safety, effectiveness, and security of human and veterinary drugs, vaccines and other biological products for human use, and medical devices. The agency also is responsible for the safety and security of our nation's food supply, cosmetics, dietary supplements, products that give off electronic radiation, and for regulating tobacco products."

https://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm624809.htm

SCHEDULE 22 – Ramazzini Institute study

https://www.saferemr.com/2018/03/RI-study-on-cell-phone.html

Thursday, March 22, 2018

Ramazzini Institute Cell Phone Radiation Study Replicates NTP Study

A newly-published study by the Ramazzini Institute (RI) replicates the heart tumor result from the NationalToxicology Program (NTP) study of cell phone radiation on rats.The RI study found increased incidence of heart schwannoma in male rats despite the use of different frequencies and much lower intensity radio frequency radiation (RFR) than the NTP study. This suggests that the primary health effect found in the NTP study is robust.

The Ramazzini Institute (RI) conducted a life-span study on rats to evaluate the carcinogenic effects of cell phone radiation.

Among male rats, the overall incidence of heart schwannoma and hyperplasia (precancerous cells) was 0.7% (3 of 412) in the control group, 1.2% (5/401) in the 5 volts/meter (V/m) group, 1.0% (2/209) in the 25 V/m group, and 3.9% (8/207) in the 50 V/m group. The 50 V/m group had significantly greater incidence than the control group ($p < .02$).

Among male rats, the overall incidence of glioma and glial cell hyperplasia in the control group was 0.0% (0 of 412), 0.7% (3/401) in the 5 V/m group, 1.4% (3/209) in the 25 V/m group, and 0.0% (0/207) in the 50 V/m group. However, these differences were not statistically significant.

The study used a different GSM cell phone carrier frequency (1800 MHz vs. 900 MHz) and much lower intensity microwave radiation exposures than the NTP study. The Specific Absorption Rates ranged from 0.001 - 0.1 W/kg SAR in the RI study as compared to 1.5 - 6.0 W/kg in the NTP study.

The Ramazzini Institute is a non-profit organization in Bologna, Italy that has conducted scientific research for more than two decades to identify and quantify environmental toxic and carcinogenic risks and evaluate the effectiveness of drugs to prevent the onset or development of cancer.

The abstract for the paper and the press release appear below.

P.S. In our six-nation study of RFR exposure, the average total RFR exposure (not just cell tower RFR) was highest in Los Angeles where it ranged from 0.72 to 1.60 V/m across eight different outdoor microenvironments (Sagar et al., 2018). The highest average total RFR value measured in our study was 1.85 V/m which was found on a university campus in Australia and was attributable to FM radio transmissions.

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Falcioni et al (2018). Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz GSM base station environmental emission. Environ Res. 2018 Aug;165:496-503. doi:

10.1016/j.envres.2018.01.037. https://www.ncbi.nlm.nih.gov/pubmed/29530389

Abstract

Background: In 2011, IARC (International Agency for Research on Cancer) classified radiofrequency radiation (RFR) as possible human carcinogen (Group 2B). According to IARC, animals studies, as well as epidemiological ones, showed limited evidence of carcinogenicity. In 2016, the NTP published the first results of its long-term bioassays on near field RFR, reporting increased incidence of malignant glial tumors of the brain and heart Schwannoma in rats exposed to GSM – and CDMA –modulated cell phone RFR. The tumors observed in the NTP study are of the type similar to the ones observed in some epidemiological studies of cell phone users.

Objectives: The Ramazzini Institute (RI) performed a life-span carcinogenic study on Sprague-Dawley rats to evaluate the carcinogenic effects of RFR in the situation of far field, reproducing the environmental exposure to RFR generated by 1.8 GHz GSM antenna of the radio base stations of mobile phone. This is the largest long-term study ever performed in rats on the health effects of RFR, including 2448 animals. In this article, we reported the final results regarding brain and heart tumors.

Methods: Male and female Sprague-Dawley rats were exposed from prenatal life until natural death to a 1.8 GHz GSM far field of 0, 5, 25, 50 V/m with a whole-body exposure for 19 h/day.

Results: A statistically significant increase in the incidence of heart Schwannomas was observed in treated male rats at the highest dose (50 V/m). Furthermore, an increase in the incidence of heart Schwann cells hyperplasia was observed in treated male and female rats at the highest dose (50 V/m), although this was not statistically significant. An increase in the incidence of malignant glial tumors was observed in treated female rats at the highest dose (50 V/m), although not statistically significant.

Conclusions: The RI findings on far field exposure to RFR are consistent with and reinforce the results of the NTP study on near field exposure, as both reported an increase in the incidence of tumors of the brain and heart in RFR-exposed Sprague-Dawley rats. These tumors are of the same histotype of those observed in some epidemiological studies on cell phone users. These experimental studies provide sufficient evidence to call for the reevaluation of IARC conclusions regarding the carcinogenic potential of RFR in humans.

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Title: World's Largest Animal Study on Cell Tower Radiation Confirms Cancer Link

Environmental Health Trust, Press Release, March 22, 2018

***Byline**: Scientists call on the World Health Organization International Agency for the Research on Cancer to re-evaluate the carcinogenicity of cell phone radiation after the Ramazzini Institute and US government studies report finding the same unusual cancers.*

(Washington, DC) – Researchers with the renowned Ramazzini Institute (RI) in Italy announce that a large-scale lifetime study of lab animals exposed to environmental levels of cell tower radiation developed cancer. A $25 million study of much higher levels of cell phone radiofrequency (RF) radiation, from the U.S. National Toxicology Program (NTP) has also reported finding the same unusual cancer called Schwannoma of the heart in male rats treated at the highest dose. In addition, the RI study of cell tower radiation also found increases in malignant brain (glial) tumors in female rats and precancerous conditions including Schwann cell hyperplasia in both male and female rats.

"Our findings of cancerous tumors in rats exposed to environmental levels of RF are consistent with and reinforce the results of the US NTP studies on cell phone radiation, as both reported increases in the same types of tumors of the brain and heart in Sprague-Dawley rats. Together, these studies provide sufficient evidence to call for the International Agency for Research on Cancer (IARC) to re-evaluate and re-classify their conclusions regarding the carcinogenic potential of RFR in humans," said Fiorella Belpoggi PhD, study author and RI Director of Research.

The Ramazzini study exposed 2448 Sprague-Dawley rats from prenatal life until their natural death to “environmental” cell tower radiation for 19 hours a day (1.8 GHz GSM radio frequency radiation (RFR) of 5, 25 and 50 V/m). RI exposures mimicked base station emissions like those from cell tower antennas, and exposure levels were far less than those used in the NTP studies of cell phone radiation.

“All of the exposures used in the Ramazzini study were below the US FCC limits. These are permissible exposures according to the FCC. In other words, a person can legally be exposed to this level of radiation. Yet cancers occurred in these animals at these legally permitted levels. The Ramazzini findings are consistent with the NTP study demonstrating these effects are a reproducible finding,” explained Ronald Melnick PhD, formerly the Senior NIH toxicologist who led the design of the NTP study on cell phone radiation. “Governments need to strengthen regulations to protect the public from these harmful non-thermal exposures.”

“This important article from one of the most acclaimed institutions of its kind in the world provides a major new addition to the technical literature indicating strong reasons for concern about electromagnetic radiation from base stations or cell towers,” stated Editor in Chief of Environmental Research Jose Domingo PhD, Professor of Toxicology, School of Medicine at Reus University, Catalonia, Spain.

“The US NTP results combined now with the Ramazzini study, reinforce human studies from our team and others providing clear evidence that RF radiation causes acoustic neuroma (vestibular schwannoma) and gliomas, and should be classified carcinogenic to humans,” stated Lennart Hardell MD, PhD, physician-epidemiologist with the Department of Oncology, University Hospital, Örebro, Sweden who has published extensively on environmental causes of cancer including Agent Orange, pesticides and cell phone radiofrequency radiation.

“The evidence indicating wireless is carcinogenic has increased and can no longer be ignored,” stated University of Toronto Dalla Lana School of Public Health Professor Emeritus Anthony B. Miller MD, Member of the Royal Colleges of Physicians of Canada and the UK, who is also a long-term adviser to the World Health Organization.

"This study raises concerns that simply living close to a cell tower will pose threats to human health. Governments need to take measures to reduce exposures from cell tower emissions. Cell towers should not be near schools, hospitals or people's homes. Public health agencies need to educate the public on how to reduce exposure from all sources of wireless radiofrequency radiation--be it from cell towers or cell phones or Wi-Fi in schools, " stated David O. Carpenter MD, former Dean of the School of Public Health at the University at Albany. "This is particularly urgent because of current plans to place small 5G cell towers about every 300 meters in every street across the country. These 5G "small cell' antennas will result in continuous exposure to everyone living nearby and everyone walking down the street. The increased exposures will increase risk of cancer and other diseases such as electro-hypersensitivity."

Ramazzini Institute investigators have completed nearly 500 cancer bioassays on more than 200 compounds, and their study design is unique in that animals are allowed to live until their natural deaths in order to allow detection of late-developing tumors. Eighty percent of all human cancers are late-developing, occurring in humans after 60 years of age. This longer observation period has allowed the RI to detect such later-occurring tumors for a number of chemicals, and their published research includes studies of benzene, xylenes, mancozeb, formaldehyde, and vinyl chloride.

The Ramazzini research results come in the wake of similar findings from the US National Toxicology Program (NTP) large-scale experimental studies on cell phone radiation. Both studies found statistically significant increases in the development of the same type of very rare and highly malignant tumor in the heart of male rats—schwannomas.

"This publication is a serious cause for concern, " stated Annie J. Sasco, MD, DrPH, SM, MPH, retired Director of Research at the INSERM (French NIH) and former Unit Chief at International Agency for the Research on Cancer/World Health Organization, France who commented that, "some of the results are not statistically significant due to the relatively small number of animals involved. Yet, that does not mean they should be ignored. Larger studies could turn out statistically significant results and in any event statistical significance is just one aspect of evaluation of the relation between exposure and disease. Biological significance and concordance of results between humans and animals clearly reinforces the strength of the evidence of carcinogenicity. The facts that both experimental studies found the same types of rare tumors, which also have pertinence to the human clinical picture, is striking,"

"Such findings of effects at very low levels are not unexpected," stated Devra Davis PhD, MPH, president of Environmental Health Trust (EHT), pointing to a Jacobs University replication animal study published in 2015 that also found very low levels of RFR promoted tumor growth."This study confirms an ever growing literature and provides a wake-up call to governments to enact protective policy to limit exposures to the public and to the the private sector to make safe radiation-free technology available."

In January 2017 at an international conference co-sponsored by EHT and the Israel Institute for Advanced Study at Hebrew University, Fiorella Belpoggi PhD, Director of Research at the Ramazzini Institute, presented the study design and the findings that RFR-exposed animals had significantly lower litter weights. Belpoggi's presentation and slides are available online. The Ramazzini findings of lower litter weights are consistent with the NTP study, which also

found lower litter weights in prenatally exposed animals. At that time, the Italian journal *Corriere* published an article about the presentation of the Ramazzini study and quoted Belpoggi's recommendation of "maximum precaution for children and pregnant women."

Noting that "current standards were not set to protect children, pregnant women, and the growing numbers of infants and toddlers for whom devices have become playthings", Davis, who is also Visiting Professor of Medicine of Hebrew University Medical Center, and Guest Editor in Chief of the journal *Environmental Research*, added, "Current two-decade old FCC limits were set when the average call was six minutes and costly cell phones were used by very few. These important, new, game-changing studies show that animals develop the same types of unusual cancers that are being seen in those few human epidemiological studies that have been done. In light of these results, EHT joins with public health experts from the states of California, Connecticut and Maryland, as well as those in France, Israel, and Belgium to call on government and the private sector to carry out major ongoing public health educational campaigns to promote safer phone and personal device technology, to require and expedite fundamental changes in hardware and software to reduce exposures to RFR/microwave radiation throughout indoor and outdoor environments, and to institute major monitoring, training and research programs to identify solutions, future problems and prevention of related hazards and risks."

"More than a dozen countries recommend reducing radiofrequency radiation exposure to children, and countries such as China, Italy, India and Russia have far more stringent cell tower radiation regulations in place when compared to the United States. However, this study provides scientific evidence that governments can use to take *even further action*," stated Theodora Scarato, Executive Director of EHT.

The article is "Report of final results regarding brain and heart tumors in Sprague-Dawley rats exposed from prenatal life until natural death to mobile phone radiofrequency field representative of a 1.8 GHz base station environmental emission" by L. Falcioni, L. Bua, E.Tibaldi, M. Lauriola, L. De Angelis, F. Gnudi, D. Mandrioli, M. Manservigi, F. Manservisi, I. Manzoli, I. Menghetti, R. Montella, S. Panzacchi, D. Sgargi, V. Strollo, A.Vornoli, F. Belpoggi (doi.org/10.1016/j.envres.2018.01.037) It appears in *Environmental Research* published by Elsevier.

SCHEDULE 23 – Michael Bevington's paper criticising 2020 guidelines

Michael Bevington – critique of 2018 draft follows on the next page

http://www.es-uk.info/wp-content/uploads/2020/02/03.11-ICNIRP-Guidelines-Unscientific-and-Not-Protective.pdf

1. Regulation of 5G

The safety of wireless communications systems is determined by their radiation output.

Public Health England (PHE) and its predecessor, the Health Protection Agency (HPA), have relied on guidelines established by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP is a non-governmental organisation based in Munich. PHE's existing decisions and guidance have been based in the ICNIRP guidelines issued in 1998, and validated by the Advisory Group on Non-Ionising Radiation (AGNIR) in 2012. In March 2020, ICNIRP issued a new set of guidelines.

ICNIRP's exposure limits, for microwave frequencies, are considered in terms of Specific Absorption Rate (SAR, measured in W kg^{-1}) and absorbed power density (S_{ab}, measured in W m^{-2}).[3] On the whole, they have changed little between 1998 and 2020:

Frequency; part of body exposed; population	**Exposure limits, 1998**	**Exposure limits, 2020**
100 kHz–boundary value (10 GHz in 1998, 6 GHz in 2020); **whole body; general public**	**0·08 W kg^{-1}**	**0·08 W kg^{-1}**
100 kHz–boundary value (10 GHz in 1998, 6 GHz in 2020); whole body; occupational	0·4 W kg^{-1}	0·4 W kg^{-1}
100 kHz–boundary value (10 GHz in 1998, 6 GHz in 2020); **head and "trunk" (1998) or "torso" (2020); general public**	**2 W kg^{-1}**	**2 W kg^{-1}**
100 kHz–boundary value (10 GHz in 1998, 6 GHz in 2020); head and "trunk" (1998) or "torso" (2020); occupational	10 W kg^{-1}	10 W kg^{-1}
100 kHz–boundary value (10 GHz in 1998, 6 GHz in 2020); **limb; general public**	**4 W kg^{-1}**	**4 W kg^{-1}**
100 kHz–boundary value (10 GHz in 1998, 6 GHz in 2020); limb; occupational	20 W kg^{-1}	20 W kg^{-1}
Boundary value (10 GHz in 1998, 6 GHz in 2020) – 300GHz; **whole body; general public**	**10 W m^{-2}**	**0·08 W kg^{-1}**

[3] The exposures in W m^{-2} were intended to be averaged over surface areas of 20 cm^2 (1998) and 4 cm^2 (2020)

Boundary value (10 GHz in 1998, 6 GHz in 2020) – 300GHz; whole body; occupational	50 W m^{-2}	0·4 W kg^{-1}
Boundary value (10 GHz in 1998, 6 GHz in 2020) – 300GHz; **head and "trunk" (1998) or "torso" (2020); general public**	**10 W m^{-2}**	**20 W m^{-2}**
Boundary value (10 GHz in 1998, 6 GHz in 2020) – 300GHz; head and "trunk" (1998) or "torso" (2020); occupational	50 W m^{-2}	100 W m^{-2}
Boundary value (10 GHz in 1998, 6 GHz in 2020) – 300GHz; **limb; general public**	**10 W m^{-2}**	**20 W m^{-2}**
Boundary value (10 GHz in 1998, 6 GHz in 2020) – 300GHz; limb; occupational	50 W m^{-2}	100 W m^{-2}

Whole-body exposures are averaged over 30 min, and local exposures over 6 min.

In addition, the 2020 guidelines contain a limitation of energy exposure: considered as specific energy absorption (measured in kJ kg^{-1}) for frequencies between 400 MHz and 6 GHz, and absorbed energy density (measured in kJ m^{-2}) for frequencies above 6 GHz. This is intended to limit heating caused by brief exposures (up to 6 min).

ICNIRP's 1998 guidelines were strongly criticised within the scientific and expert community. Because the 2020 guidelines have only recently been published, academic analysis of them is far from complete. However, many concerning features are readily apparent:

A. *Selection of sources*

ICNIRP's 1998 guidelines were widely criticised for selective and partial use of sources. They could not, in any case, take into account the vast body of research done between 1998 and 2020, although they continued to influence policy during this period.

ICNIRP's 2020 guidelines rely largely on five previous reviews: a World Health Organisation Public Consultation Document (2014),[4] a research review by the EU's Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR; 2015), and three research reports from the Scientific Council on Electromagnetic Fields of the Strålsäkerhetsmyndigheten (SSM, the Swedish Radiation Safety Authority; 2015, 2016, 2018).[5] No method of critical analysis of these reviews is described. The scientific reasoning for omitting all other reviews is not given.

[4] This document is not listed on the WHO website as one of their publications on electromagnetic fields (including those caused by RFR).

[5] The reports state that "the conclusions and viewpoints presented in the report are those of the author/ authors and do not necessarily coincide with those of the SSM."

In addition, ICNIRP claims (2020: 36) to have "considered more recent research published after the reviews from WHO, SCENIHR and SSM... (cut-off date September 1st, 2019)". No search strategy for these papers is described; inclusion and exclusion criteria are not provided, and nor is a method of systematic analysis.

This methodological approach is deeply problematic.

B. *Inaccurate analysis of sources*

One important example is ICNIRP's analysis of the animal studies done by the US National Toxicology Progam (NTP; 2018) and the Ramazzini Institute.[6] ICNIRP writes (2020: 41):

> Of particular importance is that the statistical methods deployed were not sufficient to differentiate between radiofrequency-related and chance differences between treatment conditions; interpretation of the data is difficult due to the high body core temperatures that resulted from the very high exposure levels used; and no consistency was seen across these two studies.

Each of the above three statements by ICNIRP is incorrect:

- The statistical methods passed peer review. ICNIRP does not provide any specific criticism of them.
- In the NTP 2-year study, which found increased rates of cancer with exposure to RFR, body core temperatures were not measured. (In the NTP 28-day study, which used higher exposures than the 2-year study, core temperatures were very similar in the control and exposed groups; and, on the whole, slightly lower in the exposed groups.) Body core temperatures were not mentioned by the Ramazzini group, which used whole-body exposure levels similar to those mandated by ICNIRP for humans (5–50 V m^{-1}, estimated equivalents 0·001–0·1 W kg^{-1}).
- Both studies showed increased incidence of two specific kinds of tumour: Schwannomas and gliomas. (Both studies found significantly increased rates of Schwannoma in RFR-exposed male rats; the NTP study found significantly increased rates of glioma in exposed male rats; the Ramazzini study found a notable but statistically non-significant increased rate of glioma rates in exposed female rats.)

C. *Structural bias*

ICNIRP has up to 14 members. These members appoint up to 25 scientists, to assist in making scientific recommendations.[7]

Such an organisational structure creates a risk of some perspectives being reinforced, and others excluded. In 2011, a Council of Europe report commented,

> ...One should call for genuine independence on the part of the expert appraisal agencies and for independent, multidisciplinary and properly balanced expert input. There must no longer be situations where whistleblowers and discriminated against and renowned scientists with critical opinions are excluded when experts are selected to sit on expert committees or no longer receive funding for their research... It is most

[6] Falcioni et al 2018.
[7] ICNIRP website.

> curious, to say the least, that the applicable official threshold values... were drawn up... by the ICNIRP, a body whose origin and structure are none too clear and which is furthermore suspected of having rather close links with the industries whose expansion is shaped by recommendations for maximum threshold values.

Researchers have described substantial conflicts of interest between ICNIRP and WHO and various industries that use RF communications, in particular the telecoms industry.[8] The European Parliamentary Research Service (2020) noted allegations that "many members of SCENIHR could have a conflict of interests, as they had professional relationships with or received funding from various telecom companies."

Considerable overlaps of personnel have existed between the regulatory organisations. Lennart Hardell (2017) showed that five out of six members of the Core Group responsible for the WHO consultation document on RFR (2014) had other institutional affiliations:

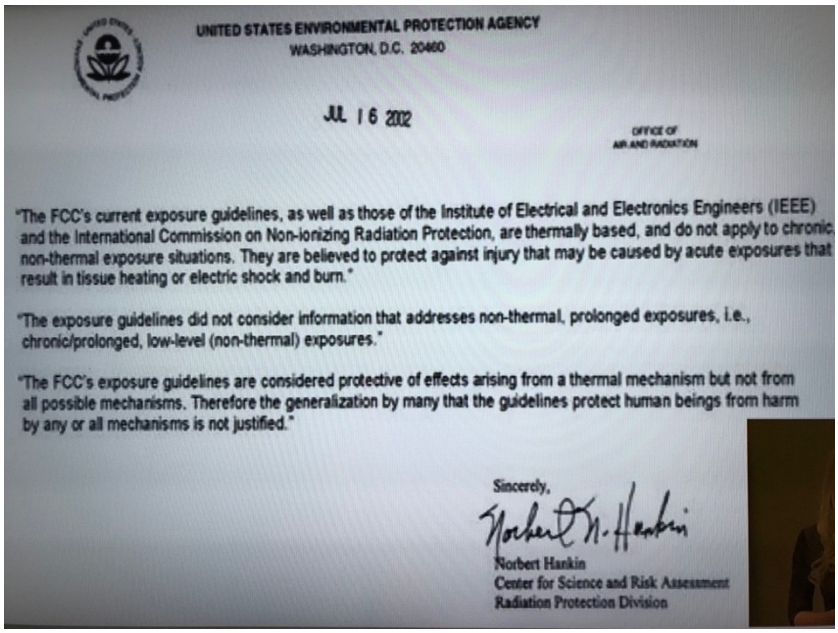
Name	**WHO**	**ICNIRP**	**AGNIR**	**SSM**	**SCENIHR**
S Mann	X	X	X		
M Feychting	X	X	X	X (former)	
G Oftedal	X	X			
E van Rongen	X	X		X	
M R Scarfi	X	X (former)		X	X
D Zmirou	X				

When AGNIR issued its report in 2012, five of its 14 members were also members of the HPA; a sixth worked for the Department of Health, which was responsible for HPA; three were members of ICNIRP, including its chairman, who was also the chairman of the ICNIRP standing committee on epidemiology.[9] Such overlaps of personnel create a conflict of interest when one organisation is asked to assess or critique the work of another.

D. *<u>Limited assessment of risk</u>*

Many mechanisms have been described through which RFR can cause biological harm.[10] The 1998 ICNIRP guidelines were strongly criticised for only acknowledging one mechanism, i.e. heat, through which RFR caused harm:

[8] Hardell 2017.
[9] Starkey 2016.
[10] Belpomme et al 2018; Belyaev et al 2016.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUL 16 2002

OFFICE OF
AIR AND RADIATION

"The FCC's current exposure guidelines, as well as those of the Institute of Electrical and Electronics Engineers (IEEE) and the International Commission on Non-ionizing Radiation Protection, are thermally based, and do not apply to chronic, non-thermal exposure situations. They are believed to protect against injury that may be caused by acute exposures that result in tissue heating or electric shock and burn."

"The exposure guidelines did not consider information that addresses non-thermal, prolonged exposures, i.e., chronic/prolonged, low-level (non-thermal) exposures."

"The FCC's exposure guidelines are considered protective of effects arising from a thermal mechanism but not from all possible mechanisms. Therefore the generalization by many that the guidelines protect human beings from harm by any or all mechanisms is not justified."

Sincerely,

Norbert Hankin
Center for Science and Risk Assessment
Radiation Protection Division

A memorandum from the US Environmental Protection Agency, noting that the ICNIRP guidelines do not address prolonged exposures, or harm caused by mechanisms other than heat.

The 2020 report notes that RFR can stimulate nerves and break down cell membranes. However, it claims (2020: 5) that the "nerve stimulation" effect is only relevant at frequencies up to 10 MHz, as above this "heating effects predominate and the likelihood of nerve stimulation decreases"; and that the prevention of cell membrane damage requires no new exposure limits, since the limits required to prevent nerve stimulation and heating are adequate. In practice, therefore, the ICNIRP guidelines remain focused almost entirely on damage caused by heat. Although heat causes harm primarily through absolute temperature rather than temperature rise, the guidelines are intended to "avoid significant increase[s] in temperature", reportedly "because it is not feasible to limit absolute temperature" (ICNIRP 2020: 5–6). The guidelines are intended to restrict temperature rises to 1°C (core body temperature), 2°C (head or torso), or 5°C (limbs).

ICNIRP has identified thresholds of exposure, below which, it states, RFR does not cause adverse health effects. The guidelines are derived by applying "reduction factors" to the adverse-health-effect thresholds. These reduction factors are intended to take into account age, sex, tissue temperature, environmental factors, dosimetric and scientific uncertainty, and a reported intention for a conservative approach. They are essentially arbitrary. For occupationally exposed workers, exposure limits are fivefold higher than for the general public, on the grounds that occupational workers are aware of the risks, able to mitigate harm, and likely to vary less than the general population in thermal physiology. This seems to confuse the presumed ability to avoid harm with the nature of the potential harm, and does not address the fact that occupationally exposed workers would, by definition, be subject to chronic and cumulative exposure.

Pregnant occupationally exposed workers are subject to the guidelines for the general public. ICNIRP (2020: 24) describes this condition as "conservative", and suggests the use of "mitigating techniques... to allow pregnant workers to enter areas where radiofrequency EMFs are at occupational exposure levels". Otherwise, guidelines for RF exposure are uniform across the population.

E. *Problematic approaches to safety issues specific to 5G*

ICNIRP claims (2020: 4, 8) that exposure to high-frequency RFR is best measured in terms of absorbed power density (power per area; W m^{-2}) rather than SAR (power per volume; W kg^{-1}), because, at high frequencies, the heating effect is largely confined to the skin. The same reasoning seems to apply to the use of kJ m^{-2} rather than kJ kg^{-1} for high-frequency energy exposures.

In the 1998 report, the notional boundary between low-frequency and high-frequency microwaves was 10 GHz; in 2020, it is given as 6 GHz. ICNIRP admits (2020: 8) that "there is uncertainty with regard to the precise frequency for the change from SAR to absorbed power density"; it claims that a boundary of 6 GHz was chosen because "at that frequency, most of the absorbed power is within the cutaneous tissue [i.e. skin], which is within the upper half of a 10-g SAR cubic volume". However, ICNIRP also notes (2020: 6) that, at 6 GHz, 86% of the power is absorbed within 8 mm of the surface. 8 mm is a substantial thickness; and in any case 14% of the power is absorbed more deeply. Moreover, radiation of the skin, by millimetre waves, causes biological effects that are not limited to the skin.[11]

The 6 GHz boundary therefore appears largely arbitrary, from a scientific perspective. However, it is used in telecommunications to mark the boundary between "low and mid-band" 5G, and the higher frequencies intended to be characteristic of 5G.

The effectiveness of W m^{-2} and kJ m^{-2} units depends on the area over which the exposure is measured. An intense beam might fall within exposure limits if surrounded by a zone of much lower radiation. 5G is intended to consist of intense, directed beams. Without mentioning 5G by name, the new regulations do introduce extra exposure limits for frequencies of 30–300 GHz, "where focal beam exposure can occur" (2020: 8). Absorbed power density (W m^{-2}) and energy density (kJ m^{-2}) are generally measured over an area of 4 cm^2. However, at 30–300 GHz, the density over an area of 1 cm^2 must not be more than twice that over 4 cm^2.

The academic community is likely to provide critical assessments of this guideline in the coming months. But even if the guideline is adequate in its own terms, it is designed only to limit heating (interestingly, ICNIRP (2020: 8) refers to ensuring that adverse-health-effect thresholds—rather than the lower limits generated through reduction factors— are not exceeded). The exposure limits do not take into account the other mechanisms by which RFR is widely thought to cause harm. Nor, according to the 2019 European Parliament report, is existing modelling of 5G at all adequate:

> Significant concern is emerging over the possible impact on health and safety arising from potentially much higher exposure to radiofrequency electromagnetic radiation arising from 5G. Increased exposure may result not only from the use of much higher frequencies in 5G but also from the potential for the aggregation of different signals, their dynamic nature, and the complex interference effects that may result, especially in dense urban areas. The 5G radio emission fields are quite different to those of previous generations because of their complex beam-formed transmissions in both directions—from base station to handset and for the return. Although fields are highly focused by beams, they vary rapidly with time and movement and so are unpredictable, as the signal levels and patterns interact as a closed-loop system. This has yet to be mapped reliably for real situations...
>
> While ICNIRP issues guidelines for limiting exposure to electric, magnetic and electromagnetic fields... the problem is that currently it is not possible to accurately simulate or measure 5G emissions in the real world.

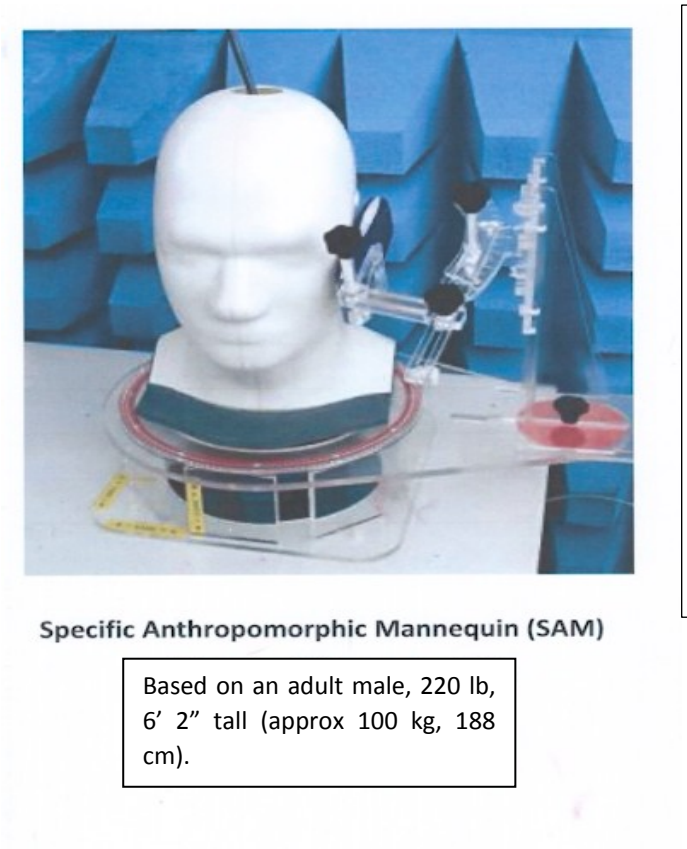
A US Senate hearing (2019) found that 5G had not been tested for safety, and no plans existed to test it.

2. How safe is wireless RFR communication?

[11] Russell 2018.

Studies that aim to establish the accuracy of current guidelines must address the following methodological issues:

1. *External validity.* Laboratories typically provide brief, constant exposures to a single frequency. This inadequately reflects the following aspects of real-world exposure:
    a. *Intensity.* The RF output from commercially available devices varies considerably in intensity, as does involuntary exposure from base stations.[12] Tests using commercially available devices are much more likely to find adverse effects than are tests using simulated exposures.[13]
    b. *Variety of signals.* Laboratory tests generally exclude the ELF signals that are superimposed on carrier waves, and may cause biological damage.[14] They also fail to replicate the variety of sources to which people are involuntarily exposed. A recent, though pre-5G, study showed that pedestrians in Stockholm were exposed to more than 20 sources of anthropogenic RFR simultaneously.[15]
    c. *Duration.* Involuntary exposure to RFR from transmitters is constant.
    d. *Other potential toxins.* In real-world situations, people are exposed to many toxic stimuli, simultaneously or sequentially. These can considerably increase the biological effects of RFR.[16]
2. *Suitability of models and simulations.*



Specific Anthropomorphic Mannequin (SAM)

Based on an adult male, 220 lb, 6' 2" tall (approx 100 kg, 188 cm).

This is SAM, a model widely used to certify mobile phones as safe, in accordance with ICNIRP guidelines. SAM is made of plastic, and is filled with a water-based gel to simulate the brain.

Safety certification is determined by the overall heating effect of the phone.

SAM has long been criticised because it is based on a man of large size, and because the outer ear is represented by a plastic spacer. Even prior to the introduction of 5G, most cell phones exceed ICNIRP safety limits if held against the body (Gandhi et al, 2013; Gandhi 2019). Exposure limits do not take into account the effects of long-term, cumulative exposure.

[12] Panagopoulos 2019; Carlberg et al 2019.
[13] Panagopoulos 2019.
[14] Panagopoulos 2019.
[15] Carlberg et al 2019.
[16] Kossoff et al 2020.

3. *Quantification of exposure.* Estimates of exposure from mobile phones often depend on the accuracy of the user's reports; in addition, RF exposure varies with the type of phone, how the phone is held, etc. Exposure to ambient RFR and RFR from a user's devices has, in general, continuously increased over the last three decades, so studies can rapidly become obsolete.
4. *Selection of population.* Some people, notably children, are thought to be more vulnerable than others to RFR.
5. *Specification of outcomes.* RFR has been found to affect the body by mechanisms that could, in theory, manifest as a wide variety of clinical conditions.[17] Moreover, while mobile phones direct radiation at the head, exposure from transmitters could affect any part of the body. It is therefore difficult to establish exactly which illnesses are caused or worsened by RFR, and to quantify its effects.
6. *Bias.* The Council of Europe (2011) noted a 2006 analysis showing that the theory that "exposure to mobile telephone radio frequencies has an effect on our organism" had been supported by 33% of studies funded by "industrial concerns"; and over 80% of publicly funded studies. Industry bias has continued to influence the design and reporting of research.[18]
7. *Inclusion and exclusion criteria.* Much research seems to have been omitted from consideration by regulatory bodies, including ICNIRP. Notably, much research in languages other than English appears to have been neglected. Of particular relevance is research showing widespread biological damage, as a result of exposure only to a single millimetre-wave carrier frequency, within ICNIRP exposure limits.[19]

Exposure to mobile phone radiation can be recorded, or at least estimated; and radiation from mobile phones is generally directed at the head. Therefore, many studies have investigated whether a link exists between mobile-phone use and brain tumours. An analogy can be drawn with smoking, which has widespread health effects, but for which many early studies focused on lung cancer.

In 2011, the World Health Organisation's International Agency for Research on Cancer (IARC) reported that studies had found a relationship between mobile-phone use and two kinds of brain tumour: glioma, a type of cancer; and acoustic neuroma, a benign tumour of the Schwann cells (Schwannoma). The associations could not be dismissed as reflecting bias alone: a causal interpretation was possible. In addition, "limited evidence" existed that RFR might be carcinogenic [cancer-causing] in experimental animals. The IARC classified RFR as a Group 2B carcinogen, "possibly carcinogenic to humans".[20]

Since 2011, evidence for a link between RFR and cancer has increased.[21] The Bradford Hill criteria, used to analyse the link between smoking and lung cancer, have been used to argue that mobile-phone radiation causes glioma.[22] Well designed and conducted studies at the US National Toxicology Program, and the Ramazzini Institute in Italy, have shown that rats exposed to RFR are at increased risk of developing gliomas and Schwannomas:[23] the same kinds of tumour associated with RF exposure in human populations. The IARC has identified the classification of RFR as a high priority for review by

[17] Belpomme et al 2018; Belyaev et al 2016.
[18] Russell 2018.
[19] Kostoff et al 2020.
[20] International Agency for Research on Cancer/ World Health Organisation 2011; Baan et al 2011.
[21] Miller et al 2018.
[22] Carlberg and Hardell 2017.
[23] US National Toxicology Program 2018; Melnick 2019; Hardell and Carlberg 2019; Falcioni et al 2018.

2024;[24] a recent review in the *International Journal of Oncology* argued that RFR should be reclassified as a Group I carcinogen, "carcinogenic to humans".[25]

In 2019, ambient mean exposures to RFR in central Stockholm were found to be within an order of magnitude of the exposures associated with tumours in the Ramazzini study.[26] If the same margins for safety were used as those claimed by ICNIRP for thermal effects, these ambient exposures would exceed ICNIRP's own safety limits.[27] Moreover,

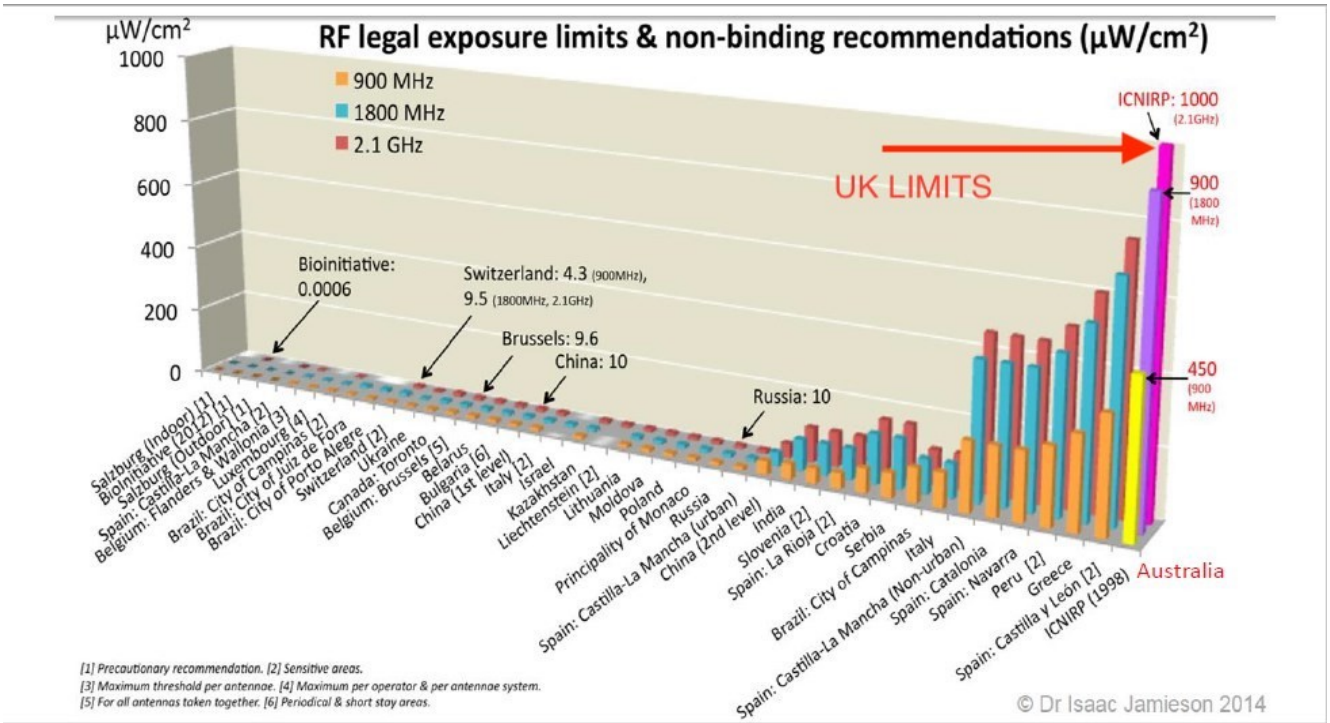
- This study predated the deployment of 5G.
- The mean exposures are less than peak exposures.
- The rats in the Ramazzini study were exposed to a single RF. In contrast, humans in Stockholm (and elsewhere) are exposed to many RFs, including ELFs; to RFR from commercially available devices; and to toxins other than RFR.

Researchers have found that exposure to RFR increases the risk of disorders other than cancer, including subfertility or infertility, and neurological and neuropsychiatric disorders. The neurological development of fetuses and children is widely thought to be affected.[28]

In western Europe, 3·5–8% of people have "electrical hypersensivity" (EHS): they report ill health as a result of exposure to electromagnetic fields, including RFR.[29] The mechanism of EHS is debated by researchers and clinicians. Some argue that it is a psychosomatic illness; others that it has neurological and other physiological causes. However, irrespective of the mechanism, the functional impairment is often marked, and can extend to severe disability.

Learned bodies and leading academics have recommended exposure limits far lower than those recommended by ICNIRP.[30] Indeed, as indicated in the following diagram, many countries have used far lower exposure limits:[31]

[24] International Agency for Research on Cancer 2019.
[25] Hardell and Carlberg 2019.
[26] Hardell et al 2019; Falcioni et al 2018.
[27] International Commission on Non-Ionizing Radiation Protection 1998, 2020; Hardell et al 2019.
[28] Belpomme et al 2018.
[29] Bogers et al 2018.
[30] Belyaev et al 2016.
[31] This diagram (reproduced with adaptations by Grigoriev 2017) reflects the 1998 ICNIRP guidelines.



The International Telecommunication Union (ITU) noted (2019) that jurisdictions including Russia, Poland, Italy, Switzerland, and the city of Paris used limits 10–100 times lower than those recommended by ICNIRP;[32] China and India also used lower limits. The ITU added that exposure guidelines stricter than ICNIRP's (1998) were "a strong limiting factor for the deployment of 4G networks", and "negatively affect all potential levers to enhance the wireless infrastructure and deployment of 5G: *spectrum* [frequencies used], *technology* [beam-forming and use of small cells] and *network topology* (number of sites and sectors)". The full development of 5G would be incompatible with the safety guidelines used in much of the world.[33] 5G may, indeed, be incompatible even with (pre-2020) ICNIRP guidelines.[34]

[32] Prof Oleg Grigoriev, Chair of the Russian National Committee on Non-Ionizing Radiation Protection, has been widely quoted as saying that 5G may be like a "slow Hiroshima".
[33] International Telecommunication Union 2019.
[34] Hardell and Nyberg 2020.

SCHEDULE 24 – OLD STUDIES SHOWING HARM

1. Naval Medical Research Institute, Maryland, USA

BIBLIOGRAPHY OF REPORTED BIOLOGICAL PHENOMENA ('EFFECTS') AND CLINICAL MANIFESTATIONS ATTRIBUTED TO MICROWJAVE AND RADIO-FREQUENCY RADIATION - RESEARCH REPORT
Zorach R. Glaser, Ph.D. LT, MSC, USNR

https://www.scribd.com/document/462506149/Naval-Research-1971-on-Rf?secret_password=3VGyL36tr3C7Mah2ie6E

2. NASA report 1981

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See Also

- **Inaccurate official assessment of radiofrequency safety by the Advisory Group on Non-ionising Radiation.** Sarah Starkey. Reviews on Environmental Health . Nov 30, 2016. https://www.degruyter.com/view/j/reveh.2016.31.issue-4/reveh-2016-0060/reveh-2016-0060.xml?lang=en
- P**art I: Why We Need Stronger Cell Phone Radiation Regulations–Key Testimony Submitted to the FCC.** May 6, 2020. https://www.saferemr.com/2014/08/part-i-why-we-need-stronger-cell-phone.html
- **Dr. Lennart Hardell Letter to Swiss Confederation about ICNIRP, Roosli and Reevaluation of radiofrequency and 5G. Jan 2, 2020 – Highlights scientific flaws in ICNIRP assessment. Lettter Hardell -re: Roosli to Mrs. SommarugaSwiss Confederation Reevalaution of safety Standards, ICNIRP 5G -BERENIS_UVEK_January 2, 2020**
- **[Comment] Appeals that matter or not on a moratorium on the deployment of the fifth generation, 5G, for microwave radiation.**Hardell and Nyberg. Molecular and Clinical Oncology. January 22, 2020. https://www.spandidos-publications.com/10.3892/mco.2020.1984
- **ICNIRP Issues Revised RF Guidelines.** Microwave News. March 11, 2020. https://microwavenews.com/short-takes-archive/icnirp-rf-guidelines-2020
- **FCC Proposes No Change to Its RF Standards.Existing Rules Will Apply to 5G Phones and Infrastructure.** Microwave News. August 8, 2019. https://microwavenews.com/short-takes-archive/fcc-rf-limits
- **Physicians for Safe Technology Letter to Anna Eshoo regarding re-evaluation of RF safety standards.** Oct 1, 2019. https://mdsafetech.files.wordpress.com/2019/10/eshoo-pst-letter-in-respone-to-fda-shuren-letter-on-rf-safety-standards-4-101119-correctedpdf-1.pdf
- **Review of Published Literature between 2008 and 2018 of Relevance to Radiofrequency Radiation and Cancer.** FDA. February 2020. https://www.fda.gov/media/135043/download
- **Conflicts of Interest and Misleading Statements in Official Reports about the Health Consequences of Radiofrequency Radiation and Some New Measurements of Exposure**

Levels. (2019) Susan Pockett. Magnetochemistry 2019, 5(2), 31. May 5, 2019. **https://www.mdpi.com/2312-7481/5/2/31/htm**

- **The inconvenient truth about cancer and mobile phones: We dismiss claims about mobiles being bad for our health – but is that because studies showing a link to cancer have been cast into doubt by the industry?** July 14, 2018. The Guardian. Mark Hertsgaard and Mark Dowie. **https://www.theguardian.com/technology/2018/jul/14/mobile-phones-cancer-inconvenient-truths**
- **How Big Wireless Made Us Think That Cell Phones Are Safe: A Special Investigation. The disinformation campaign—and massive radiation increase—behind the 5G rollout.** By Mark Hertsgaard and Mark Dowie. March 29, 2018. The Nation. **How Big Wireless made Us think Wireless Was Safe**
- **CHAIRMAN PAI PROPOSES TO MAINTAIN CURRENT RADIOFREQUENCY EXPOSURE SAFETY STANDARDS.** August 8, 2019. https://docs.fcc.gov/public/attachments/DOC-358968A1.pdf
- **FCC Resolution of Notice of Inquiry RF Emission Exposure Limits.** Nov 27, 2019. https://docs.fcc.gov/public/attachments/FCC-19-126A1.pdf
- **Human Exposure to Radiofrequency Electromagnetic Fields; Correction**. https://www.federalregister.gov/documents/2020/04/15/2020-07866/human-exposure-to-radiofrequency-electromagnetic-fields-correction
- **To file a Comment to FCC** – https://www.fcc.gov/ecfs/filings as above
- **To look at Comments to FCC for this docket** https://www.fcc.gov/ecfs/filings and click on Search in upper right corner. Put in Docket 19-226

https://mdsafetech.org/2020/05/08/fcc-seeks-comments-on-new-human-exposure-safety-standards-for-5g-and-beyond-radiofrequency-electromagnetic-fields/