

To: The Honorable Governor Brown
From: Dr. Cindy Russell
RE: SB649 SB 649 (Hueso) Wireless Telecommunications Facilities
Date September 19, 2017

Dear Honorable Governor Brown:

I am an MD and lifelong democrat who has followed your governorship in awe of your knowledge and thoughtfulness about the major environmental issues we face as humans. I respect your honesty and direct communications about trying to balance environmental and public health concerns with business interests so California can continue to be a powerful economic force. It is certainly not easy being a leader of this fine State, where I have lived most of my life, still appreciating the beauty and diversity we have here. My interest and perspective has always leaned towards public and environmental protection for my patient's health as well as sustainability of our fragile planet.

I am asking you to VETO SB649 as the full long term effects of this broad piece of legislation are not understood and have not been explored including concerns with

- Contribution to global climate change with increased energy use
- Mushrooming E-Waste
- Public health and public safety of increasing electrical grid input and 5G frequencies
- Environmental health
- Liability to cities for unforeseen damages
- Privacy
- Security of personal and medical data
- Loss of local governmental control.

Working through my local Santa Clara County Medical Association and the California Medical Association, I have for many years, put forth resolutions to reduce exposures to toxins, especially those we are exposed to on a regular basis. Learning the connection between environmental toxic exposures and chronic health conditions, has made many in health care realize how important preventative measures are for economic reasons as well as societal well-being. According to the CDC the annual health care expenditures for people with chronic and mental health conditions is \$2.3 trillion annually (113). A significant portion of this cost could be reduced by improving public and environmental health factors which cause or contribute to chronic diseases of our modern society.

Early exposures to seemingly small doses and mixtures of chemicals can hijack development of the reproductive, immune and neurologic systems. Similarly, we are finding that radiation from wireless technology we are increasingly exposed to is harmful to all biologic systems and thus acts as a toxic exposure to a wide variety of normal cellular processes. Studies show that microwave non-ionizing radiation from wireless devices is consistently associated with damage to sperm, brain cells, DNA, proteins and cell membranes and even plants and trees. (85-96) Despite industry claims, this non-ionizing radiation has been found to be harmful, even by government agencies such as NASA, Defense Intelligence Agency and the Naval Research

Institute. (105, 106, 107) Scientists who have performed research on this for decades would be happy to discuss this with you.

SB649, written by the telecommunications industry, aims to streamline placement of wireless antenna in cities and residential neighborhoods and is now before you. Please think carefully about what the bill promises to accomplish with regards to financial gains for the state and jobs, versus the long term health, privacy and democratic consequences of this bill that will carry into the future and become a burden to our children and their children. Retaining local authority is the basis of our democracy, and with this bill further erosion of communities will ensue. With purchases online now, local businesses are shutting down along with revenue to cities.

SB649 will worsen this financial situation as their revenue will not pace mandated but underfunded expenses. This is softened somewhat by legislation taxing online purchases but the evidence is already evident in our communities with more and more business closures.

Other issues regarding SB649 have not been addressed by California Legislators as this bill never reached any environmental or health committee during its review. Wireless devices and infrastructure have been assumed to be safe and environmentally neutral.

As more people are learning about his bill opposition has grown and now includes labor organizations and environmental groups such as the Sierra Club, Environmental Working Group and the Communication Workers of America. The environmental, human health and occupational hazards are now more apparent. Please consider the issues below in your deliberations.

1) Energy consumption:

A high Utility Bill contributing to global climate change will ensue as digital communications and the digital economy have a large carbon footprint. A significant increase in energy consumption will result from manufacturing, installing and maintaining the infrastructure of 5G for faster downloading of more data such as video streaming which consumes large amounts of energy. (13,14,15,16, 28, 29)

According to a report “The Cloud Begins with Coal”, the gains in improved energy efficiency of the devices is overshadowed by the energy costs of using the product more for heavy data transfer, manufacturing more products, replacing products when they become obsolete and to support Cloud infrastructure. (13)

Another report on energy use and devices indicates “**growing energy requirements for future computing needs will hit a wall in the next 24 years if the current trajectory is correct. At that point, the world will not produce enough energy for all of the devices that are expected to be drawing power.**” (29)

AB32, California’s landmark Global Warming Solutions Act of 2006 requires California to reduce its GHG emissions to 1990 levels by 2020 — a reduction of approximately 15 percent below emissions expected under a “business as usual” scenario. (68) The expected billions/trillions of global devices manufactured and connected to the Internet of Things would negatively contribute to California’s if not global energy reduction goals despite California’s advances in renewable energy. (69) Fiberoptic and wired connections are cheaper, more energy

efficient and more secure. That is what large medical systems use to keep patient data private. (28,29,30,31,32)

2) E-Waste Mushrooming:

Hazardous waste increases. Technological advancement, cheap labor, planned obsolescence and lack of strict and enforceable regulation make discarded electronics the world's fastest-growing source of waste. Globally this is 41 metric tons per year and in North America this is 11 metric tons per year. (65) Electronics including cell phones, computers, Wi-Fi routers contain toxic materials such as lead, mercury and cadmium, brominated flame retardants and hexavalent chromium in addition to rare earth elements and precious minerals that could be recycled (urban mine). The hazardous components can harm the environment and people.

A Trillion IoT Devices planned. The federal Resource Conservation and Recovery Act addresses hazardous waste however E-waste is exempt and considered regular waste. Although over 25 states have laws requiring recycling, companies can ship their waste overseas legally and as seen in a recent study by MIT illegal shipments are common. It showed that about **a third of electronics in the U.S. are illegally shipped to foreign ports and dismantled by children and low income workers.** The plastic is burned causing toxic air pollution and drinking water contamination. (57,58) Estimates are up to a trillion devices with IoT capability by 2035. (112)

3) Public Health Concerns:

No Evidence of Safety for 5G. The telecommunications industry is rolling 5G antennas out so rapidly that they are ahead of any evidence that this will be safe for the public or the environment. The frequencies, modulation and power have not been fully vetted by industry, let alone given consideration of the long term adverse effects of this widespread exposure to the public. Current FCC testing looks only at heat or thermal damage, not the biological effects widely demonstrated in the literature. This bill gives industry the power to place antennas even if it is deemed by scientific experts potentially unsafe or harmful to humans or wildlife.

Evidence of biologic harm is established. Despite industry claims of safety, scientific evidence clearly demonstrates non-thermal biological harm to cellular structures including DNA, proteins and cell membranes that can lead to cancer, reproductive failure and neurologic dysfunction. Almost every study on sperm effects shows abnormal changes in structure and function of normal sperm at non-thermal level of wireless radiation that people are already exposed to. A plethora of studies show direct harm to brain cells which indicate a contribution to neurodegeneration is highly likely. Studies have demonstrated one mechanism to be that of oxidation causing cellular disruption, similar to other toxic exposures. Research has shown an association between radiofrequency EMR exposure and a variety of health issues, in addition to injury to trees, plants, wildlife and insects. With all this science of harm, how can further expansion of wireless be reasonable? (85-96)

Electro-sensitivity rising and identified in firefighters who are exempt from cell tower legislation in SB649. More people in all walks of life are reporting vague symptoms of headaches, insomnia, mental confusion, heart palpitations and fatigue in the presence of wireless devices and when in close proximity to cell towers. This is consistent with various studies internationally which show 3 to 10% of the population are electrosensitive. NASA, the Department of Defense, the EPA and other countries recognize microwave illness, a.k.a. electrosensitivity as a real medical diagnosis. (3,4,5,6,8,19,41)

The International Association of Firefighters (IAFF) developed a policy that supports their successful efforts to have cell towers blocked from placement on their fire stations after noting that many of their firefighters became sick (classic symptoms of microwave illness) after cell towers were placed on or near their facilities. A pilot study of California firefighters was conducted in 2004 following a five-year exposure to a cell tower next to the station. The men were found to have brain abnormalities on SPECT brain scan consistent with their symptoms of severe headaches, insomnia, irritability, mental confusion. In addition, performance testing revealed delayed reaction time, lack of impulse control, and cognitive impairment. (113) These are not symptoms we want to see in our first responders. These are not symptoms we want to see in our general population. It is notable that these were healthy men who had not worked HazMat, so chemical exposure was not a variable. Most important of all, nearly everyone else in the population is more vulnerable than our firefighters.

Firefighters have an exemption in SB649 due to health concerns, thus codifying that health issues are a legitimate argument. This request for exemption is supported by international studies which have looked at health effects of those living near cell towers. The majority of published studies in different countries have shown a relationship between distance from base stations and a variety of health complaints. They have found that the closer to the towers people live (less than 300 meters) there is an increase incidence of reported symptoms including headache, lack of concentration, memory loss, irritability, depression, insomnia, fatigue, loss of libido, nausea, lack of appetite. (77-84)

Cell towers found to cause blood abnormalities. In a recent study from India, Zothansiam et al (2017), researchers examined abnormalities in blood samples in people living at different distances from cell towers. They identified a significant increase blood cell damage in those living within 80 meters of a cell tower versus those living greater than 300 meters from a cell tower. They found 1) A significant increase in micronuclei, which are small remnants of DNA nuclear material appearing within blood cells and a sensitive indicator of genotoxicity and chromosomal abnormalities 2) An increase in lipid peroxidation indicating free radical formation and cell membrane damage 3) A reduction in levels of internally produced antioxidant capacity (glutathione, catalase and superoxide dismutase). (77)

The author concluded “The present study demonstrated that staying near the mobile base stations and continuous use of mobile phones damage the DNA, and it may have an adverse effect in the long run. The persistence of DNA unrepaired damage leads to genomic instability which may lead to several health disorders including the induction of cancer.” As more base stations are deployed with higher density and with ubiquitous connection this wireless technology is poised

to contribute to the trillions of dollars spent annually on chronic diseases related to these and other toxic exposures.

Exposure to electromagnetic frequencies will increase and harm will be additive. There will be no reduction in the microwave frequencies we are already exposed to with 5G expansion. In addition, 4G technology will likely be placed in small cell antenna prior to 5G systems. 5G technology is even less well studied but evidence to date shows adverse health effects. (1) According to the 1996 Telecommunications Act, once a structure is designated as a cell tower site modifications can be made and other telecommunications systems can be added if it will not result in a “substantial change”. There is a lack of monitoring of current infrastructure for both levels of radiation and basic safety. More work needs to be done by scientists and legislators prior to this massive increase in cell towers.

4) Liability Concerns

In a 2013 Emerging Risk Report, Zurich based Swiss Re, the second-largest reinsurer in the world and the insurer of the World Trade Center, listed electromagnetic fields in the highest category of casualty risk due to “unforeseen consequences” beyond 10 years. They and many other companies will not cover damages due to wireless products and infrastructure. (24) There is a general insurance exclusion now applied across the market as standard. The purpose of the exclusion they state is to exclude coverage for illnesses caused by continuous long-term non-ionizing radiation exposure. (18,19) The insurance industry already knows of the harm from wireless devices and infrastructure. (108)

Cities have learned some unfortunate lessons regarding general liability for fires or other accidents from cell towers and wireless infrastructure that they cannot regulate. The fire in Malibu in 2007 due to overloaded poles is an example of problems that can occur. (25,26)

We need to slow down and put in place policies which address privacy, security, radiofrequency radiation exposure monitoring as well as health, and environmental precautions before proceeding with new technologies such as 5G or Air Gig expansion, as Europe is doing. (55, 56, 60, 110) Perhaps AT&T’s practices should be investigated. (109, 110, 11) It is inappropriate to streamline expansion of these new small cell antennas until updated standards are developed. While profits may be realized in the short term, indirect costs will overshadow those in the long run.

Thank you for your thoughtful consideration to protect the health, safety and vitality of California.

Cindy Russell, M.D.

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