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Health Effects from Wireless Devices
Research Paper
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English 10/Bass

As stated by the International Agency for Research on Cancer, wireless electronic devices are currently labeled, “possibly carcinogenic to humans.” After my personal research and comparison between multiple credible sources, it seems the health effects of cell phones and other wireless devices should be given further consideration. I also believe there is more than originally meets the eye when understanding the precautions put on wireless devices by international and government agencies.

Tracking health effects of technology is difficult at a time when technology itself is advancing at such a rapid pace, not to mention evidence is rarely consistent because studies will take place over many years. It has been found that within this extensive time period, multiple factors can change creating inaccurate results. Constant exposure to radiation from wireless devices can change as can the health choices of each individual participating in a study. The people in scientific studies cannot be closely monitored over many years and factors such as genes and lifestyle are not easily altered. By the end of a specific study, it is hard to tell what caused the results and how we can use that information in the future. Today there are over 4.6 billion new cell phone subscriptions each year (World Health Organization) and that number is growing at an alarming rate. Along with this background information it is also important to realize that monitoring RF (Radio Frequencies) radiation from cell phones is spread out across 8 agencies that are all responsible for large amounts of research. These agencies are: the Environmental Protection Agency (EPA), The Food and Drug Administration (FDA), Institute of Electrical and Electronics Engineers (IEEE), Occupational Safety and Health Administration (OSHA), World Health Organization (WHO), National Institute for Occupational Safety and Health (NIOSH), National Council on Radiation Protection and Measurements (NCRP), and the Federal Communications Commission (FCC). The majority of these agencies put very little effort towards monitoring radiation from wireless devices, because of financial cutbacks and lack of time. With this in mind, you must first understand what this radiation is so you can understand why it should be monitored.

According to James Lochner, who earned his Ph.D. at GSFC (studying X-ray variability in black hole candidates, cell phones and other wireless devices put off electromagnetic waves which are made of electric and magnetic forces. These forces create patterns when moving through the air and have different frequencies and amounts of energy. A source with greater energy will vibrate faster, this results in shorter wavelengths, which are more harmful. The chief bands of the Electromagnetic Spectrum are: gamma rays (which produce the most energy), x-rays, ultraviolet light, visible light, infrared rays, microwaves, and radio waves (producing the least energy). These different forms of radiation impact the environment through reflection, diffraction (spreading), and refraction (bending). Their impact is measured in Nanometers, Hertz, and/or Electron Volts. Our atmosphere protects us from some of the EM waves but because of the inconsistency it becomes even more difficult to study. In conclusion, it is important to realize

that although radiation generally has a negative connotation it is a constant benefit as well, a related example would be cell phones themselves. Cell phones put off frequencies into the air allowing us to be connected to one another, its hard to imagine life without the social aspect that wireless devices surround us with. This may sound contradictory but we have to ask ourselves if the benefits outweigh the consequences.

The limits that have been placed on radiation levels from wireless devices and cellphones are called SAR's. This stands for Specific Absorption Rate and it increases per unit with the mass of a body. This means that the more bodily mass you have, the more radiation your body can handle. (World Health Organization). The allowable rate created by the Federal Communications Commission is 1.6 watts per kilogram as averaged over one gram of tissue. In the United States all wireless devices must be approved through a process done by the FCC to ensure they have a safe SAR level. If the electronic device doesn't meet the requirement created by the FCC, any agency can withdraw its approval. By withdrawing its approval the agency will simply take its name off some hidden label saying the device is safe. The problem is that although the approval may have been withdrawn the item can still be sold without any type of warning. In order to find out if your wireless device is on the "safe" list, it requires sorting through many government websites which is a long, tedious process that the majority of the public does not want to deal with (Federal Communications Commission's).

When we look at the actual health effects that wireless devices have proven to have on the health of humans the results have varied from study to study. Most agencies agree the requirements are acceptable for the moment but long term studies should be done because they aren't sure how technology is changing what we know. The problem that has been created is that while all agencies agree the health risks from cell phones are changing. No one is willing to step up and continue to do more studies, let alone give the results to the public. Based on the studies I was able to access, I found that no specific cases of cancer or any other serious health effects can be directly linked to wireless devices. Although many statistics point us in that direction. Most energy given off by cell phones is absorbed by the skin but in a study where 50 people were tested, 47 showed a change in brain activity and a heating in organs and tissue. This type of tissue and organ heating are known to be a cause of cancer and other defects like tumors and mutations. The energy from electronics penetrates 3 inches into a average human skull and completely crosses the skull of a child. This was measured in a study done by WHO in which "an average human skull" refers to a large headed, oversized male. In my opinion, this is not a study that should be used to protect the general population from cell phone radiation. One example of a cancer risk is shown in a study that was done in 13 countries over 10 years. It was published that only the highest 10% of cell phone users were "very likely" to have glioma (A type of skin cancer) (World Health Organization). When we look at other studies that have been done in a similar fashion, there are never results published on the effects cell phones may have on teenagers. It has been shown that radiation from wireless devices is more harmful to the brains and organs of small children (proved in a study done by Dr. Nora Valcow, lead author of the JAMA study). I personally believe it should be essential that studies are done on adolescents because in this era, cell phones are a immense part of teenagers lives. Cell phones along with other wireless devices such as Ipads and Ipods also can put off RF radiation and energy when they access Wi-Fi or any source of data. Dr. Stephanie Wagner of Indiana University's Health

and Science department believes radiation may have negative developmental effects on children and may also be the cause of: epilepsy, A.D.D, and behavioral issues in general. (Dearoff)

As I mentioned in my introduction, I believe that there is more than meets the eye when understanding the precautions put on wireless devices by international and governmental agencies. When doing my research in order to answer specific questions and gain a general understanding of RF radiation, and how it affects our health, I ran into multiple inconveniences that caught my attention. The first thing is something I have brought up multiple times already in this paper, the agencies I have gotten the majority of my research from are all sponsored by the government or attached to it in some way. Although this is not a bad thing, it raises the question of why certain information isn't being published. In my research I kept on reading about, "all the studies" done on RF radiation and its health effects. In reality, I couldn't find any studies that were actually finished with published results or any studies that didn't support cell phone companies. After originally noticing this, the information I was finding became more and more shady. When we look at who is conducting or sponsoring the actual studies it usually comes back to major electronic device companies and corporations. If this isn't interesting enough, take in account the fact that many cancer foundations are funded by products that are known to cause cancer/health risks. One of them being, cell phone companies. As stated by Russell Owen, chief of the FDA's Radiation and Biology Branch, "There is not significant new evidence in the past year that there is need for greater concern than already exists." He later denied that any concern exists but recommended the public take certain precautions when using wireless devices. Why would we be told wireless devices are safe enough to spend money on but for our safety we should take precautions? As I stated earlier the IARC labeled cell phones possibly carcinogenic to humans while the National Cancer Foundation said cell phones have produced no cancer levels in any studies conducted by any agency. Although I don't expect every fact to always match between sources, this seems like a fairly large miscommunication between agencies that are designated to protect the public. I wonder if like many multi-million dollar companies the truth is evaded in order to keep the constant flow of money coming in. In our society money controls more than we probably realize. Many analysts say that the information coming out of the government agencies is biased and not back up by facts or statistics. Part of the problem is that most of the agencies that are trying to cover these health risks aren't actually responsible for the issue, which explains why the research and concern is minimal. A large portion of responsibility is thrown on the Food and Drug Administration, which technically doesn't have a department that fits this research and when we look at everything this agency has to monitor... It's overwhelming. This poses the question... Who is responsible for monitoring radiation from wireless devices and keeping the public safe when we live in a time of technology and electronics? (Stearnagel; Dearoff; World Health Organization; Federal Communications Commission)

There are multiple precautions the general public can take in order to protect themselves from the negative effects of electromagnetic frequencies produced by wireless devices. Some of these ways to stay safe are recommended by the government and others are ideas from private organizations and people concerned about the negative impact we have seen in the past. The most important and easily agreed upon action that can be taken is simply to distance oneself from a wireless device. Whether this means using a speakerphone, earpiece, or headset it will decrease heating of tissue in the brain. Avoid keeping phones in your pocket, instead keep them

by your bed at night as an alarm clock. The public should also avoid long phone conversations on wireless devices and instead use landlines when possible. Texting also limits RF radiation to the brain because it increases the distance. Although most cell phones have similar RF wavelengths, phones with data plans tend to use more radiation to send and receive signals. Most devices operate at low power levels on a regular basis. When a phone has all 5 bars of service, it means the levels of radiation are higher because it has the ability to function at high speeds. Overall, creating distance and managing time when using wireless devices will limit exposure to electromagnetic frequencies, causing less negative health effects (World Health Organization).

In conclusion, based on credible research, I believe that electromagnetic frequencies have the tendency to cause negative health effects. I also believe that there is not adequate concern from government agencies regarding the safety of the public in a time when wireless devices are an essential part of life. The public should be aware of the problems our generations face and demand further studies of this current issue in order to be well educated.

Word Count: 2150