

MEMORANDUM

TO: Milt Bowling
Eileen O'Connor

FROM: George Carlo

DATE: July 26, 2006

RE: Comments on Chris Woollams paper, "It's Your Call"

Hope all is well with you. I have taken a read through Chris's paper and believe it is the start of what can be a very good piece of work. However, as it is now written, I believe it gives too much credance to what the science seems to say on the surface – versus what it really says, and it does not yet give the readers the strongest possible tools they would need to make a truly informed, critical judgement.

Below is some background information that can perhaps help sharpen the message to readers. If there is anything else I can do, please let me know.

More On The Premise That All Studies Are Not Created Equal

1. Since the publication of the results of the \$28.5 million WTR research indicating mobile phone health risks, the mobile phone industry has put into place a global program to control the research agenda addressing the question of mobile phones and health effects. The experience of allowing the science to speak on its own backfired for the industry and they do not want to make the same "mistake" again.
2. The mobile phone industry program is sophisticated, and involves controlling the outcome of research by directly and indirectly controlling the funding. In many cases, the industry money is in effect laundered through such groups as the World Health Organization, the American Cancer Society and regulatory groups such as the U.S. Food and Drug Administration and the Federal Communications Commission. In other cases, industry funds the gathering of "independent scientists" to review the state of the science and then use the opinion as evidence of no problem in cell phone package inserts and promotional materials.
3. There is strong evidence to show that the key bodies that provide emission standard advice to regulatory agencies, the IEEE and the ANSI, are strongly influenced by the mobile phone industry.
4. The result is a clear dichotomy in results of studies and opinions of review groups depending on where the support funding comes from.
5. In the past year, scientists have begun to speak out more publicly about the industry "hijacking of the science." It is becoming a fact within science circles that the negative influence of industry money is significant.

6. When studies are arrayed in terms of funding source – i.e. as either independent or industry funded/influenced – industry funded/influenced work is six times more likely to find “no problem” than independently funded work. The difference is statistically significant. The industry thus has significantly contaminated the scientific evidence pool, with the clear purpose of making sure that a general “weight of evidence” analysis would always tilt in their favor.
7. This factual information begs the question of what studies should be considered by those trying to honestly assess the health risks of mobile phones, or at least, how specific studies should be weighted. In short, all studies are not created equal and most people in the media who have written about this issue fall into the trap of trying to “quantitatively” weigh the evidence without assessing the “quality” of the work.

We Know A Great Deal About the Dosimetry and Underlying Mechanisms of Harm – This Provides Strong Scientific Support For Causation That Is Usually Not Addressed in Industry Reviews or Media Reports:

1. The current science shows that there are two distinct types of radiation plumes capable of contributing to the development of tumors. The near-field plume has been studied most extensively and the science indicates that the near-field plume – usually within six to eight inches of the center of the antenna – is the most intense and is the most efficient tumor contributor. The far-field plume is considered to have less of an impact – with most effects being stress related – although at least one study has suggested that genetic effects can indeed result from far-field exposures. Anyone who uses a mobile phone is exposed to both the near-field and far-field radiation.
2. Over the past four years, the science has become very precise. It is now clear that the primary indicator of the size of the near-field plume is the amount of power being used by the phone in carrying the information signal. The further away the nearest base station, the more power is needed to carry the signal. The influence of distance is likely more important to the size of the radiation plume than number of calls made or the length of calls made. Thus, while the intensity of the radiation plume is a complicated variable, the most important aspect is that the intensity of the plume determines the amount of brain tissue exposed.
3. Over time, as the density of base-stations has increased, the amount of power necessary to carry a call has decreased. Early adopters of the cell phone would have years of exposure to higher intensity radiation plumes. It is noteworthy that there is no threshold below which the radiation plume is safe, especially since the mechanism of harm is not intensity dependent.
4. The science now shows that the intensity of the radiation plume is not the primary determinant of the severity of damage caused by cell phone use – the coherence or form of the information carrying wave is. This adds another complicating aspect to the elements of dose.
5. This complication of dose makes it difficult to discern clear dose-response relationships in the published epidemiological studies because the correct

- variables – distance from base station and precise area of brain tissue exposed – can not be easily measured.
6. It is possible that some exposures in mobile phone users reach thermal limits, however, most people now assume the mechanism to be non-thermal.
 7. The accumulative science now shows that the primary non-thermal mechanism of danger to brain tissue within the near-field plume derives from a series of events triggered by recognition by the brain cell membrane that a coherent, invading radio wave is present.
 8. It is noteworthy that the carrier wave – in most cases many years of around 837 megahertz and some years of around 1900 megahertz – is not easily recognized by the brain cell membrane. It is oscillating too fast to be picked up biologically. The membrane recognition occurs when the information carrying wave – a secondary wave in the 2 – 40 hertz range – is present. For example, there is a 2 hertz signal identifying presence in range of a base station; also, when talking occurs there is a 40 hertz wave carrying voice information.
 9. Once the membrane recognition occurs, a series of protective biochemical reactions are initiated inside the cell as a means of cellular protection. Included are stress protein responses that serve to “harden” the cell membrane and disrupt active transport. The “membrane hardening” effect causes an intracellular build-up of waste products including highly reactive free radicals.
 10. These reactive molecules are involved in at least two pathways associated with cancer induction. The first occurs when the mitochondria are attacked resulting in cellular dysfunction including diminished apoptosis – damaged cells that would normally self destruct continue to live and function aberrantly. The second mechanism involves interference with normal process DNA repair.
 11. It is noteworthy that several experiments have been done where these effects can be eliminated when the mobile phone radiation exposure is taken away. This is the important concept of dose-response down, a critical component of the Koch-Henle Postulates for determining cause and effect.
 12. These two mechanistic pathways impact all critical stages of tumorigenesis. DNA repair interference and reduction in apoptosis can lead to genetic mutational changes that many times are self-replicating – the process of tumor initiation. Fixation of the deviant cells is evidenced by the presence of micro-nuclei in a number of studies of mobile phone radiation exposure. General impairment of normal cellular function, especially mechanisms that are meant to stop aberrant cell growth, can facilitate tumor promotion or growth to a neoplastic stage and progression to metastases.
 13. Thus, it is important to understand that chronic contact with the near-field plume, as well as the accumulating scientific evidence detailing the impact of the near-field plume on cellular, tissue and organ function, provide strong biological plausibility for the premise that mobile phones are a cause of brain cancer.

More On Human Studies:

1. Since 1999, there have been more than 20 peer-reviewed studies published regarding human exposure to mobile telephones. There have also been published more than a dozen reviews of the scientific evidence regarding cancer risk – all but one funded by the mobile phone industry. It is noteworthy that no where more evident than in the epidemiology is the hand of the mobile phone industry involvement more obvious.
2. A comprehensive 2004 review of the existing nine epidemiology studies at the time by Kundi et al. – independent researchers from the European Union who received no industry funding or support – concluded that although each of the studies had methodological flaws, all studies approaching a reasonable degree of cancer latency showed an increased risk of cancer associated with mobile phone use, and that the risk is enhanced by increasing latency and duration of use. It is important to note that for carcinogens such as cigarette smoke and asbestos, seven to ten decades of exposure were necessary before studies were able to show the same degree of risk we now see with mobile phones – and within two decades of use. This suggests that radiofrequency radiation is possibly a more potent carcinogen than cigarette smoke or asbestos.
3. Since 2004, a series of peer-reviewed studies have been published substantiating the increased risk of tumors associated with mobile phone use. As of July 2006, more than 300 hypothesis tests indicating a statistically increased risk of mobile phone related tumors have appeared in the open, scientific, peer-reviewed literature. Most, but not all, of these findings appeared in studies funded independently of the mobile phone industry.
4. A specific example of industry manipulation: The Interphone sponsored acoustic neuroma study published in the fall of 2005, and funded partially by the mobile phone industry, was lauded in press releases by the mobile phone industry as showing no increased risk of cancer associated with mobile phone use. The press release was made public up against electronic media filing deadlines – ensuring that there would be little fact checking for the story. The electronic media ran with the story as written in the press releases. The problem: the study did not deal with cancer and within the abstract itself indicated a statistically significant increased risk of tumors associated with mobile phone use of more than ten years. Some print media printed the correct information, but the electronic media did not follow up with corrections. It is noteworthy that an Israeli newspaper wrote about the misleading press release.
5. Significantly, a study published in the Indian Journal of Human Genetics in 2005 on human volunteers using mobile phones, showed genetic damage increased in both the blood and saliva of mobile phone users compared to non-users. This was the first in vivo evidence in humans substantiating the genetic damage findings of the late 1990s.
6. There are several human epidemiological studies supporting the brain cancer risk claim and a human volunteer study supporting the genetic damage mechanism.

Scientifically Assessing Cause and Effect Leads to a Much Clearer Answer Than Most Realize:

1. The Koch-Henle Postulates (below in bold italics) serve as the strongest and most widely accepted template for determining scientific cause and effect. The science provides strong support in each of the critical postulate areas for the premise that mobile phone use is a cause of brain tumor.
2. We first talked about the scientific postulates in our Cell Phones: Invisible Hazards in the Wireless Age book, and over the five years since that publication the evidence has steadily accumulated strengthening the evidence of cause and effect.
3. Specifically: ***Biological Plausibility*** (the mechanism whereby mobile phone radiation causes harm is known); ***Consistency of Findings*** (there are now several studies in each important scientific discipline showing problems); ***Temporality*** (especially among early adopters of the cell phone, there is no question that exposure occurs long before tumors present); ***Statistical Significance*** (more than 300 statistically significant increased risk ratios are published in the peer-reviewed literature); ***Dose-Response Upward*** (the longer the years of use and the longer the latency, the higher the risk); ***Dose-Response Downward*** (several studies now show that when the radiation exposure is taken away, the adverse effects reverse as well); and ***Concordance of Findings*** (evidence of harm comes from dosimetry studies, in vitro studies, in vivo studies, epidemiology studies, and human experiments).
4. The mobile phone-health effects science thus provides solid support for the premise that mobile phone use can cause brain cancer.