

REPORT OF THE RF SAFETY COMMITTEE TO THE ARRL BOARD OF DIRECTORS

January 2006

The RF Safety Committee has participated in the following areas over the past six months:

1. RF Safety Committee Activities.
2. Monitoring recent scientific studies regarding RF Safety.
3. Participation in the scientific RF Safety community.
4. Administrative issues.
5. Future Plans.

1 RF Safety Committee Activities

- 1.1 Dr. Siwiak worked with an ARRL member in Florida who was being sued by his neighbors over his antenna tower. The lawsuit was directed against the tower for what appeared to be aesthetic reasons but an RF safety claim was made as another excuse to have the tower removed. That portion of the lawsuit was eventually dropped as having no foundation.
- 1.2 Regarding the lawsuit that Dr. Siwiak helped with, the committee contacted several ARRL experts in tower law, Fred Hopengarten, K1VR, Jim O'Connell, W9WU, and Chris Imlay, W3KD, with a question about the prevalence of RF safety claims against hams in antenna tower litigation. Mr. O'Connell replied that it is typical in such lawsuits for an RF safety claim to be made and that "the case law is very favorable for the ham since the Still line of cases holding that RFI issues were preempted and I don't worry much about the allegation." He further opined that "doing an RF measurement using the Texas software just makes the case for higher towers," something with which the RF safety committee is in full agreement.
- 1.3 A woman who was concerned about the safety of her baby after her neighbor erected what she described as "2 amateur radio antennas" contacted the ARRL lab after reading the ARRL TIS on RF safety. Zack Lau, W1VT, replied with a well-worded description in layman's terms of RF safety issues with regard to transmitting antennas. The woman sent photos of the two antennas and we ascertained that one was a discone, likely used for receiving only, and the other was a vertical that appeared to be cut for 27 MHz. The committee decided that no additional response to this woman would be helpful.
- 1.4 The committee corresponded with a ham that was concerned about the MPE rating of a 5W handheld transceiver. Dr. Guy provided a lengthy explanation of the issues related to operation of handheld transceivers. He stated that exposure from handheld transceivers has not been studied in much detail but indications from the little data that is available are that exposure from such devices is far below the limits set forth in the safety standards.
- 1.5 The committee corresponded with a ham that was operating a VHF/UHF repeater at his home and was concerned about exposure to his family from his roof-mounted antennas. Mr. Hare performed a number of calculations on this scenario and concluded that the exposure was borderline when treating the ham's family members as part of the uncontrolled population, rather than treating them as controlled population as hams are

permitted to do. Since the ham's young daughter was sleeping in a bedroom directly below the antenna's ground plane, Mr. Hare felt that the uncontrolled population limits would be more applicable to the situation.

- 1.6 In October the committee was asked to review a list of 60 potential RF-Safety related questions for the Technician exam. We identified errors in the questions, answers and detractors and pared the list down to the best 15 representative questions, as requested.
- 1.7 In the beginning of January the committee was again presented with a smaller list of 11 RF-Safety questions for the Technician exam. After reading them over, it was clear that our suggestions a few months earlier had not been fully considered. The committee provided critiques of the new questions, answers and detractors and suggested ways to fix them. Perry Green, WY1O, represented the committee's comments to the QPC and, after two iterations with them, was able to get most of the changes incorporated.

2 Monitoring Scientific Studies

- 2.1 On July 27 Dr. Lapin traveled to Bethesda, MD to meet with Dr. Kenneth Cantor. Dr. Cantor is the lead investigator of a long-running retrospective epidemiological study of Amateur Radio operators. By comparing death records to the FCC Amateur Radio Service License Database, the study hopes to ascertain whether or not there is a connection between being a radio amateur and disease. Dr. Cantor visited ARRL Headquarters and met with members of the RF Safety Committee on April 28, 2000 to discuss his then pending study. While this has been a long running study due to its relatively low priority, the investigators have not given up trying to get conclusive results.
- 2.1.1 Dr. Cantor and Dr. Lapin first spent about half an hour discussing the study with Dr. Peter Inskip, who is a collaborator on this study and is better known as the lead author of a ground-breaking study of cellular telephone users that showed no excess of disease among those subjects. Dr. Cantor then shared an abstract of the first set of results that were assembled from this study. In short, they studied 108,586 subjects who had lived in California any time between 1966 and 1995. California death records, the National Death Index, and the Social Security Administration mortality listings were used to track which of these people had died, resulting in 1,734,930 person-years of study. This group was subdivided into subgroups based on license class, with the expectation that high license classes indicated more intense activity on the radio and a likelihood of employment in broadcasting or electronics industries. Deaths were compared to standard population death rates, subdivided by disease and results were expressed as SMRs, or Standard Mortality Ratios. An SMR of 1.0 means that the test group has the same rate of death from a particular cause as the standard population. An SMR of 2.0 means that the test group is twice as likely to die from a particular cause than the standard population, and an SMR of 0.5 means that the test group is half as likely to die from a particular cause than the standard population. Because these are statistical calculations, a 95% confidence interval was calculated for each SMR. Thus an SMR of 2.0 with a confidence interval of 1.0-3.0 means that the test group appears to be twice as likely to die of a disease than the standard population but the uncertainty of the numbers is such that the SMR could have been anywhere between 1.0 and 3.0. Such a result is not considered to be statistically significant because 1.0 is within the 95% confidence limits.

2.1.2 The relevant results from the study so far are as follows:

2.1.2.1 Cancer Deaths: 0.79 (0.76-0.81) - this is a significant result that hams are less likely to die of all cancers than the standard population.

2.1.2.2 Glioma Deaths: 1.14 (0.97-1.30) – this is a non-significant result that hams appear to be slightly more likely to die of this type of brain tumor than the standard population.

2.1.2.3 Leukemia Deaths: 0.89 (0.80-1.03) – this is a non-significant result that hams appear to be slightly less likely to die from any form of leukemia (blood cancer) than the standard population.

2.1.2.4 Chronic Myelogenous Leukemia Deaths: 1.2 (0.90-1.70) – this is a non-significant result that hams appear to be slightly more likely to die from this specific form of leukemia than the standard population.

2.1.2.5 Hodgkin's Disease Deaths: 1.3 (0.90-1.90) – this is a non-significant result that hams appear to be slightly more likely to die from this form of lymphatic cancer than the standard population.

2.1.2.6 ALS Deaths: 1.21 (0.90-1.60) – this is a non-significant result that hams appear to be slightly more likely to die from this form of nervous system degeneration (Lou Gehrig's disease) than the standard population.

2.1.2.7 Laryngeal Cancer Deaths: 0.60 (0.40-0.80) – this is a significant result that hams are less likely to die from this often smoking-related disease than the standard population.

2.1.2.8 Lung Cancer Deaths: 0.65 (0.61-0.69) – this is a significant result that hams are less likely to die from another disease that is often related to smoking than the standard population.

2.1.3 Dr. Cantor and Dr. Lapin discussed how these results should be interpreted. To Dr. Cantor it was pretty clear that these numbers were interesting to report as is, but Dr. Lapin cautioned him that in the hands of a layman it would be easy to imply that hams had increased incidence of certain diseases. The layman, or lay press person, usually does not appreciate the statistical uncertainties represented in the confidence interval. Dr. Cantor was pleased that his numbers, which were based on the largest study population to date, were in good agreement with past studies of hams and also of electrical, electronics, and broadcasting industry workers. Dr. Lapin mentioned that the studies by Milham, which were presented as being very damning of our hobby, had many flaws but we concluded that the study was not so much flawed as were Dr. Milham's conclusions, many of which were unwarranted based on the statistical uncertainties. Dr. Lapin and Dr. Cantor discussed that the lay public usually does not appreciate the distinctions between a preliminary study and one with full information about the subjects.

2.1.4 Dr. Cantor also discussed the effects of Socio-Economic Status (SES), since hams tend to be from higher SES groups, which have been associated with lower incidence of disease. The smoking-related diseases tracked well with license class, with the highest license classes having the lowest incidence of lung cancer (only 0.40 for Amateur Extras compared to 0.80 for all hams). Even though this is the biggest study of its kind, errors in the results are possible due to some very small numbers. For instance, ALS is such a very rare disease, and this study only found 40 cases of ALS in 108,586 subject deaths, that a single misdiagnosis could throw off the results considerably.

- 2.1.5 The next stage in this study will be to select interesting disease subgroups and to add occupation as a factor. This should help to increase the significance of the results. Dr. Cantor promised to stay in touch and keep us apprised of future developments.
- 2.2 The committee discussed an article in the British Journal of Cancer, which reported the conclusions of a study of cellular telephone use and incidence of acoustic neuromas, a tumor in the head outside the brain, along the acoustic nerve. The study showed no increased risk of cell phone users getting this type of tumor. This study was important since it was performed with the best data set to date and its conclusion was in direct opposition to that of a similar study from Hardell in Sweden several years earlier.
- 2.3 The committee was made aware of a Supreme Court decision not to hear an appeal by various cellular telephone manufacturers and providers which allowed a number of health-related class-action lawsuits against them to go forward. The cellular telephone industry wants all health-related RF regulation to be performed by the federal government rather than individual states so they do not have to deal with a myriad of potentially conflicting rules.
- 3 Participation in the Scientific RF Safety Community.
 - 3.1 Dr. Lapin continues to serve on the IEEE Committee on Man and Radiation (COMAR).
 - 3.2 Mr. Hare and Dr. Guy continue to serve on the IEEE Standards Coordinating Committee 28 on Non-Ionizing Radiation, which develops the standards for human exposure to RF energy. Mr. Hare maintains a list server for communications among members of this committee, and occasionally cross-pollinates pertinent issues between the RFSC and SCC-28 list servers.
 - 3.3 Mr. Hare presented the Committee with the draft of part of a new revision of one section of the IEEE RF Safety Standard, IEEE C95.7D, "Recommended Practice for Radio Frequency Safety Programs, 3 kHz to 300 GHz." The Committee recommended that Mr. Hare cast a vote to "Approve" this revision of the standard.
- 4 Administrative Issues
 - 4.1 The Committee will be renewing and revising its membership in the coming year to insure that it contains members who wish to actively participate in its deliberations.
- 5 Future Plans
 - 5.1 The committee is considering if there is a need to revise the RF Safety text used in ARRL publications.

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