



The Role of Health Education in Addressing Uncertainty about Health and Cell Phone Use—A Commentary

Dhitinut Ratnapradipa, William P. Dundulis, Jr., Dale O. Ritzel, and Abdul Haseeb

Ratnapradipa D, Dundulis Jr WP, Ritzel DO, Haseeb A. The role of health education in addressing uncertainty about health and cell phone use—a commentary. Am J Health Educ. 2012;43(1):5-7. Submitted February 2, 2011. Accepted August 1, 2011.

Although the fundamental principles of health education remain unchanged, the practice of health education continues to evolve in response to our rapidly changing lifestyles and technological advances. Emerging health risks are often associated with these lifestyle changes. The purpose of this article is to address the role of health educators when scientific uncertainty exists about these emerging topics. Specifically, how can health educators ensure that their information is both current and credible, and what can health educators do to educate the public about minimizing potential risk factors.

We are in a constantly-updating information age when Internet access provides near-instantaneous access to information about a variety of health-related topics. The ease of contributing to the online store of information means that not all sources are of equal weight. Depending on the host site, posts may or may not be vetted. Consequently, the health educator *must* learn how to keep up with all these changes. As one of the seven core areas of responsibility for Certified Health Education Specialists (CHES), serving as a health education resource person (Responsibility VI) includes retrieving information electronically and

evaluating resources (Competency A).¹ An important role for today's health educator is to teach individuals how to evaluate this vast quantity of health-related information and make sense of information that may be contradictory, even when coming from reputable sources.

Before we can educate others, we must ensure that our own knowledge base is up to the task. Health educators cannot be experts in every possible health-related topic. Therefore, we must first hone our own cyber skills to keep up with the constant flow of new, and often contradictory, information on various health-related topics. It would also be beneficial to maintain a working relationship with our academic and professional colleagues who could assist us as subject matter experts for various health-related topics.

Health educators may find the following guiding questions helpful when evaluating information sources for reliability and validity, as well as to weigh the relevance of any conflicting results.

- *Methodological strength:* What study design was used and why? How were samples selected? How was data collected, analyzed and interpreted? What are the stated limitations of the research? How broadly can the findings be applied? Are the findings a preliminary study or

part of a larger body of work? Has the research, conducted with sound methodology, been replicated with consistent findings? Published articles address this topic in greater detail.²⁻⁴

- *Date of research:* New research is constantly updating our knowledge base of health-related information. When we have contradictory information that has all been through a comparable peer-review process and is of comparable methodological soundness, we should give more weight to the most current information.

- *Source bias:* Who conducted the research,

Dhitinut Ratnapradipa is an assistant professor in the Department of Health Education and Recreation, Southern Illinois University Carbondale, Pulliam Hall 307, Carbondale, IL 62901; E-mail: dhitinut@siu.edu. William P. Dundulis, Jr. is an Environmental Health Risk Assessment Toxicologist at the Rhode Island Department of Health, Providence, RI 02908. Dale O. Ritzel is a Professor Emeritus in the Department of Health Education and Recreation, Southern Illinois University, Carbondale, IL 62901. Abdul Haseeb is a resident physician in the Department of Family and Community Medicine, Southern Illinois University School of Medicine, Carbondale IL 62901.



and what are the researchers' credentials? Where do the researchers work (government agency, academia, non-profit group, for-profit group, or a combination of these)? Who funded the research, directly or indirectly? What are the stated (and hidden) agendas for the organization(s)? Where is the research being published, and what review process was used to evaluate it before it was published or posted? If a source is summarizing or providing an overview of research, is all important information included?

We can now proceed to use these techniques to evaluate one of the current "hot topics" in environmental health: Potential health impacts resulting from cell phone use. Theoretically, incidence of cancer initiated by hand-held cellular phone use would likely be in the head and neck area, particularly the brain tissue.^{5,6} A hypothetical model⁷ has been introduced to explain how non-thermal effects may potentially cause cancer in long-term cellular phone users via chronically activating heat shock proteins. The authors of this hypothesis claim that while heat shock proteins are a normal response to cellular damage, chronic heat shock protein expression promotes both metastasis and oncogenesis. Therefore, the authors imply that long-term cellular phone usage may repeatedly activate heat shock proteins from chronic cellular stress due to non-ionizing radiation, ultimately causing cancer.

There have been a number of case-control and meta-analysis studies which appear to support the argument that cell phone use can cause cancer.^{6,8,9} A pool analysis of two case-control studies concluded that cellular phones increase risk of developing malignant brain tumors, with the highest possibility belonging to individuals that have used cellular phones longer than ten years.⁹ Results from another meta-analysis indicated a higher risk of developing glioma (type of tumor that starts in the brain or spine) and acoustic neuroma (a noncancerous or benign, often slow-growing tumor of the nerve that connects the ear to the brain) was associated with use of a cellular phone for ten plus years.⁶ Another meta-analysis which evaluated data from 23 case-control

studies observed an increased risk of brain tumors with using a cellular phone for a time period of ten years or longer.¹⁰ On the other hand, a recent paper by the Interphone Study Group¹¹ noted that no increase in risk of glioma or meningioma was observed with use of mobile phones. However, there were suggestions of an increased risk of glioma at the highest exposure levels, but biases such as non-blinding of case and control subject status, and differences in response rates between the two groups, prevented a causal interpretation.¹¹

The meta-analysis by Myung et al¹⁰ highlights some of the criteria outlined above. Specifically, these authors assessed methodological quality and found that the studies by Hardell et al were of higher quality than those by the Interphone group, particularly as they related to blinding the status of subjects as case or control. These authors also felt the need to highlight the concern that funding sources may potentially influence research design and results. Many of the studies were conducted within the past five years and so are of comparable date. The studies by French et al. and Ng are older, however, and focus more specifically on the mechanism by which cell phone use potentially causes cancer. All of these studies appear to have been published in reputable peer-reviewed professional journals or as symposia proceedings, and can be assumed to have some credibility. However, caution is advised with respect to references from symposia proceedings. The review process and selection criteria can often be much less stringent than a peer-reviewed professional journal.

An Internet search also identifies information from the websites of several organizations (with acknowledged expertise and objectivity in this area) which does not support any link between cell phone use and cancer. However, these sites were recently updated to reflect a potential cancer risk. The National Cancer Institute (NCI)¹² reports that cell phone users have no increased risk of two of the most common forms of brain cancer—glioma and meningioma (a type of tumor that grows from the protective mem-

branes, called meninges, which surround the brain and spinal cord). The World Health Organization (WHO)¹³ reports that epidemiological studies provide no consistent evidence of a causal relationship between radiofrequency exposure and any adverse health effect. The sites indicate that the studies reviewed have too many limitations to completely rule out an association, as evidenced by the recent announcement by the International Agency for Research on Cancer's May 31, 2011 press release classifying radiofrequency electromagnetic fields from cell phone use as a possible carcinogen.¹⁴

Can all this apparently contradictory information be correct? What is the final word on any linkage between cell phone use and cancer? The jury is still out on this issue, due in part to the lack of long-term epidemiological data. However, given the large number of mobile phone users, it is important to investigate, understand and monitor any potential public health impact. WHO notes that the increasing use of mobile phones and the lack of data for mobile phone use over time periods longer than 15 years warrant further research of mobile phone use and brain cancer risk.¹³ WHO suggests that one of the important factors to be considered in future studies is the recent popularity of mobile phone use among younger people and a potentially longer lifetime of exposure.

These types of situations are where the role of the health educator becomes critical. We must help others understand that despite doing our due diligence to research a health-related topic, we sometimes will not get a definitive answer. Our audience must also be taught the concept of "prudent avoidance" (i.e., minimizing exposure to a potential hazard while monitoring the peer-reviewed literature for more current health-effects information). In the case of cell phone use, the NCI and WHO Fact Sheets provides several exposure criteria that are easily translated into health education tips to limit or reduce exposure,^{8,9} thus meeting CHES sub-competency VI.C.3 to assemble educational materials.¹ While limiting cell phone use (in terms of frequency



or duration of calls) may be an obvious but impractical suggestion, something as simple as using a hands-free device or speaker phone is a risk reduction.

In conclusion, today's health educators must ensure that their own skills remain adequate to access and evaluate cyber-based health-related information. We must also update our courses on a regular basis to ensure that our students will be receiving both the latest information and the skills to evaluate any health-related information that may be published in the future. In the case of scientific uncertainty, health educators can be proactive in educating others about reducing exposure risks on current topics of concern, even when causation has not been clearly established.

REFERENCES

1. National Commission for Health Education Credentialing, Inc. *Responsibilities and competencies for health educators*. Available at <http://www.nchec.org/credentialing/responsibilities>. Accessed January 7, 2011.
2. Cook DA, Levinson AJ, Garside S. Method and reporting quality in health professions education research: a systematic review. *Med Educ*. 2011;45(3):227-238.
3. Green LW, Glasgow, RE. Evaluating the relevance, generalization, and applicability of research: issues in external validation and translation methodology. *Eval Health Prof*. 2006;29(1):126-153.
4. Heller RF, Verma A, Gemmell I, Harrison R, Hart J, Edwards R. Critical appraisal for public health: a new checklist. *Public Health*. 2008;122(1):92-98.
5. Khurana VG, Teo C, Kundi M, Hardell L, Carlberg M. Cell phones and brain tumors: a review including the long-term epidemiologic data. *Surg Neurol*. 2009;72(3):205-214.
6. Hardell L, Carlberg M, Soderqvist F, Mild KH. Meta-analysis of long-term mobile phone use and the association with brain tumours. *Int J Oncol*. 2008;32(5):1097-1103.
7. French P, Penny R, Laurence J, McKenzie, D. Mobile phones, heat shock proteins and cancer. *Differentiation*. 2001;67(4-5):93-97.
8. Ng KH. Proceedings of the International Conference on Non-Ionizing Radiation at UNITEN (ICNIR2003). *Non-Ionizing Radiations-Sources, Biological Effects, Emission and Exposures. Electromagnetic Fields and Our Health*. October 20-22, 2003.
9. Hardell L, Carlberg M, Mild KH. Pooled analysis of two case-control studies on use of cellular and cordless telephones and the risk for malignant brain tumours diagnosed in 1997-2003. *Int Arch Occup Environ Health*. 2006;79(8):630-639.
10. Myung SK, Ju W, McDonnell DD, Lee YJ, Kazinets G, Cheng CT, et al. Mobile phone use and risk of tumors: a meta-analysis. *J Clin Oncol*. 2009;27(33):5565-5572.
11. The INTERPHONE Study Group. Brain tumour risk in relation to mobile telephone use: results of the INTERPHONE international case-control study. *Int J Epidemiol*. 2010;39(3):675-694.
12. National Cancer Institute. *Cell phones and cancer risk*. Available at: www.cancer.gov. Accessed June 25, 2011.
13. World Health Organization. Electromagnetic fields and public health: mobile phones (Fact sheet No. 193). Available at: www.who.int. Accessed June 25, 2011.
14. International Agency for Research on Cancer. Press Release No. 208: IARC classifies radiofrequency electromagnetic fields as possibly carcinogenic to humans. Available at: http://www.iarc.fr/en/media-centre/pr/2011/pdfs/pr208_E.pdf. Accessed June 25, 2011.