Health Effects of Mobile Phone Usage

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INTRODUCTION

We provide an overview of the relationship between exposure to cellular and cordless phone radiofrequencies and possible health effects. One key concern is the large disparity between the results from public- and from private-funded research. Drawing on Tomatis (2005), founder and long-serving (1969-1993) head of International Agency for Research on Cancer (IARC), the method used in many private-funded studies is such as to raise background noise, increasing confusion, thereby making assessment of risk more difficult. It is thus important to critically assess the scientific validity of these studies: a crucial point we raise is the conflicts of interest often affecting the parties involved, whether individual scientists, international journals, or safety agencies. The implications are far reaching, going beyond the lack of awareness in mobile phone (MP) users regarding health risks, and limited insight on potential improvements due to failures in scientific research. The prime consequence is that collective decisions concerning how these devices should be produced and made available are precluded by the fallacious scientific knowledge that vested interests explicitly pursue.

A pioneer study exposing carcinogenic risk arising from MP use was published by Hardell (Hardell et al., 2002) of the Dept Oncology, University Hospital, Orebro, Sweden. This seminal work has now been extended by a number of notable authors: Davis (Davis, 2010) of the Environmental Health Trust, Tetom Village, WY USA; Gee (Gee, 2009) at the European Environment Agency, Copenhagen, Denmark; Lloyd Morgan (Lloyd Morgan, 2009) in Albany, CA USA; Kundi (Kundi, 2009) at the Environmental Health Institute, University of Vienna, Austria. In addition, one of the present authors, Levis (Levis et al., 2011), has worked in this field for more than 10 years, and has frequently been called as an expert witness to give evidence in the context of MP court cases.

Investigators in newer areas of research, tackling the increasing challenges of acute and chronic effects of electrohypersensitivity, include Johansson (Johansson, 2006) at the Karolinska Institute and Royal Institute of Technology, Stockholm, Sweden; Khurana (Khurana, 2010) at the

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Australian National University Medical School, Garran, Australia; and Grigoriev (Grigoriev, 2011) at the Federal Medical Biophysical Center, Moscow, Russia.

OVERVIEW

According to the International Telecommunications Union, by the end of 2013 the number of cellphone subscriptions reached 6.8 billion, with 4.4 billion users, half being children and young adults. There are no data for cordless phones, but 3 billion users is a reasonable assumption. Given these figures, even a modest increase (20%) in tumor risk for MP users would result in significant social costs, while higher risks could lead to a crisis of dramatic proportions. While most technologies carry risks, these should be assessed accurately and responsibly. Whether or not there is a relationship between MP use and head tumor risk is still under debate: progress requires a critical analysis of the methodological elements essential to any impartial evaluation of contradictory results.

CURRENT SCIENTIFIC KNOWLEDGE

MPs were introduced onto the market in the 1980s, and widely used during the following decade in the USA, Scandinavia and Israel. From the early 1990s MP use spread quickly in other countries, with a resulting almost global exposure to MP radiation for >20 years. Although head tumors may have very long latency times (even 30 years or more), it is likely that some due to MPs could be diagnosed after ≥10 years of use or latency, as in the case for long-latency tumors due to ionizing radiation, asbestos or smoking. Studies by the same author (Hardell, Carlberg & Hansson-Mild, 2006a,b; Hardell, Carlberg, Soderqvist & Hansson-Mild, 2013a,b) as well as other authors (Han, Kano, Davis, Niranjan & Lunsford, 2009; Khurana, Teo, Kundi, Hardell & Carlberg, 2009; Dubey, Hanmandlu & Gupta, 2010; Sato, Akiba, Kubo & Yamaguchi, 2011; Coureau et al., 2014), report a statistically significant (s.s.) increase (from >100% to >300%) in risk of ipsilateral malignant (gliomas) and benign (meningiomas) cerebral tumors, and of benign acoustic-nerve tumors (neuromas) among MP users, after use or latency ≥10 years. Moreover, the increase in annual incidence of brain and nervous-system tumors was correlated with potential confounders and environmental risk factors in over 100 countries using ecological data: the only exogenous risk factor consistently associated with higher incidence was penetration of MP subscription rate (De Vocht, Hannam, & Buchan, 2013; Hardell & Carlberg, 2013). Instead, several researchers have drawn their own conclusions from the results of the Interphone studies, which involved research groups from 13 countries (Interphone Study Group, 2010, 2011) and are considered reassuring in their failure to find any increased risk of head tumors in MP users. It is therefore vital to understand the weight of the conflicting data here.

We carried out a critical examination of the protocols and results from all epidemiological case-control and cohort studies, pooled analyses, and meta-analyses on head tumor risk among MP users (Levis, Minicuci, Ricci, Gennaro & Garbisa, 2011, 2012). For each study we identified the elements that should be taken into account to ensure impartial evaluation of reliability.

Methodological elements needed to ensure the reliability of studies on the relationship between MP use & increased head tumor risk:

- Frequency of MP use and compatibility of latency and/or exposure time since first use of MPs with progression time of the examined tumors;
- Inclusion among the exposed of all users of MPs, cordless included;
- Laterality of head tumor localization relative to the habitual laterality of MP use;
- Percentage of actually exposed subjects, number of subjects selected (cases and