

## LETTER TO THE EDITOR

**Ken Karipidis\* and Rick Tinker**

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Sir, Comments on:

Bandara P and Weller S. *Biological effects of low- intensity radiofrequency electromagnetic radiation – time for a paradigm shift in regulation of public exposure. Radiation Protection in Australasia*, Vol. 34, No. 2, pp. 2-6, 2017.

and

Leach V and Weller S. *Radio frequency exposure risk assessment and communication: Critique of ARPANSA TR-164 report. Do we have a problem? Radiation Protection in Australasia*, Vol. 34, No. 2, pp. 9-18, 2017.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) published its radiofrequency (RF) Standard in 2002 (ARPANSA, 2002). The ARPANSA Standard was based on guidelines produced by the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998), which is the peak international body for the development of guidelines related to non-ionising radiation. ICNIRP guidelines are developed by teams of international experts and are endorsed by health authorities such as the World Health Organization as international best practice.

In developing the 2002 Standard, ARPANSA considered all possible effects including chronic and acute effects at low levels (often termed non-thermal effects) and these were reviewed in annexes 3 and 4 of the Standard. It was the assessment of the Working Group developing the Standard that the health implications of low level effects were not substantiated and such data could not be used for setting exposure limits in the Standard. The ARPANSA Standard did Australian Radiation Protection and Nuclear Safety Agency, 619 Lower Plenty Road, Yallambie Vic 3085 Australia recognise that research into low level effects was continuing and amendments to the Standard may be required in the future. In order to compensate for uncertainties in the scientific knowledge, the ARPANSA Standard incorporated large safety factors into the exposure limits i.e. the limits were set well below the level at which effects were known to occur.

Since the publication of the ARPANSA Standard, research in the area of RF and health has grown rapidly and several major research programs and reviews have been undertaken internationally. In July 2012 ARPANSA established a Radiofrequency Expert Panel with the task of assessing whether there are any significant changes to the science underpinning ARPANSA's RF Standard and whether the Standard provides adequate protection. ARPANSA published a report on the findings of the Expert Panel in March 2014 (ARPANSA, 2014). As outlined in the Terms of Reference for the RF Expert Panel (on page 64 of the report) the review was based mainly by examining existing major reviews of the literature including reviews by national and international health authorities; the reviews that were examined are listed on page 62 of the report. Panel members were thus not expected to carry out a formal paper-by-paper review of the literature.

In assessing the evidence from various reviews, the report (TR164) found that there is no substantiated evidence that RF exposure at levels below the limits of the ARPANSA Standard causes harm to humans. Specifically on oxidative stress the report mentions that "many recent in vitro experiments reporting RF effects have pointed to the production of Reactive Oxygen Species (ROS) as a possible link between RF exposure and adverse bio-effects. However, the putative link between RF energy and altered ROS production remains tenuous".

While the report found that the ARPANSA Standard provides adequate protection, it identified areas where the Standard could be updated to take account of increased knowledge. ICNIRP is currently revising its RF guidelines and ARPANSA is planning to update the RF Standard following the publication of the ICNIRP document. Furthermore it is acknowledged that there are still gaps in the knowledge and research should continue. Recently ARPANSA published a report on which identified research gaps and made recommendations on new research in this area (ARPANSA, 2017).

We hope that we have clarified the misrepresentations raised in the papers by Bandara and Weller, and Leach and Weller. TR164 achieved the goals set out in the Terms of Reference of the Expert Panel. ARPANSA stands by the findings of the report which are in line with the advice from other national and international health authorities.

## **REFERENCES**

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