



Australian Government
**Australian Radiation Protection
and Nuclear Safety Agency**



The Australian Radiation Protection and Nuclear Safety Agency's Electromagnetic Energy Program

A/Prof Sarah Loughran
Director of Radiation Research and Advice
ARPANSA



We are Australia's
primary health authority
on radiation protection
and nuclear safety



We provide science-based health advice to governments, industry and the Australian public



Our vision is a safe radiation environment for the Australian community.

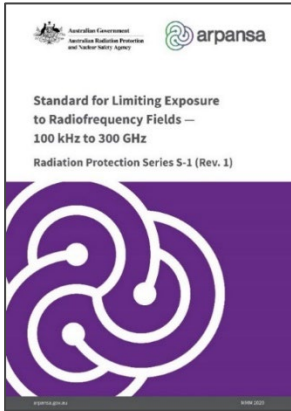
MAIN SWITCH
CRANE

MONITORING

PATCH PANEL

DETECT
DING
CLE
FED FR

ARPANSA's EME Program



EME Safety Standard



EME Measurements



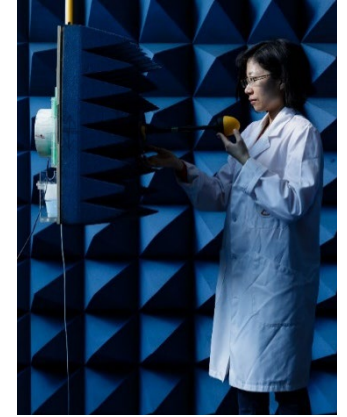
Research



Communication



International engagement

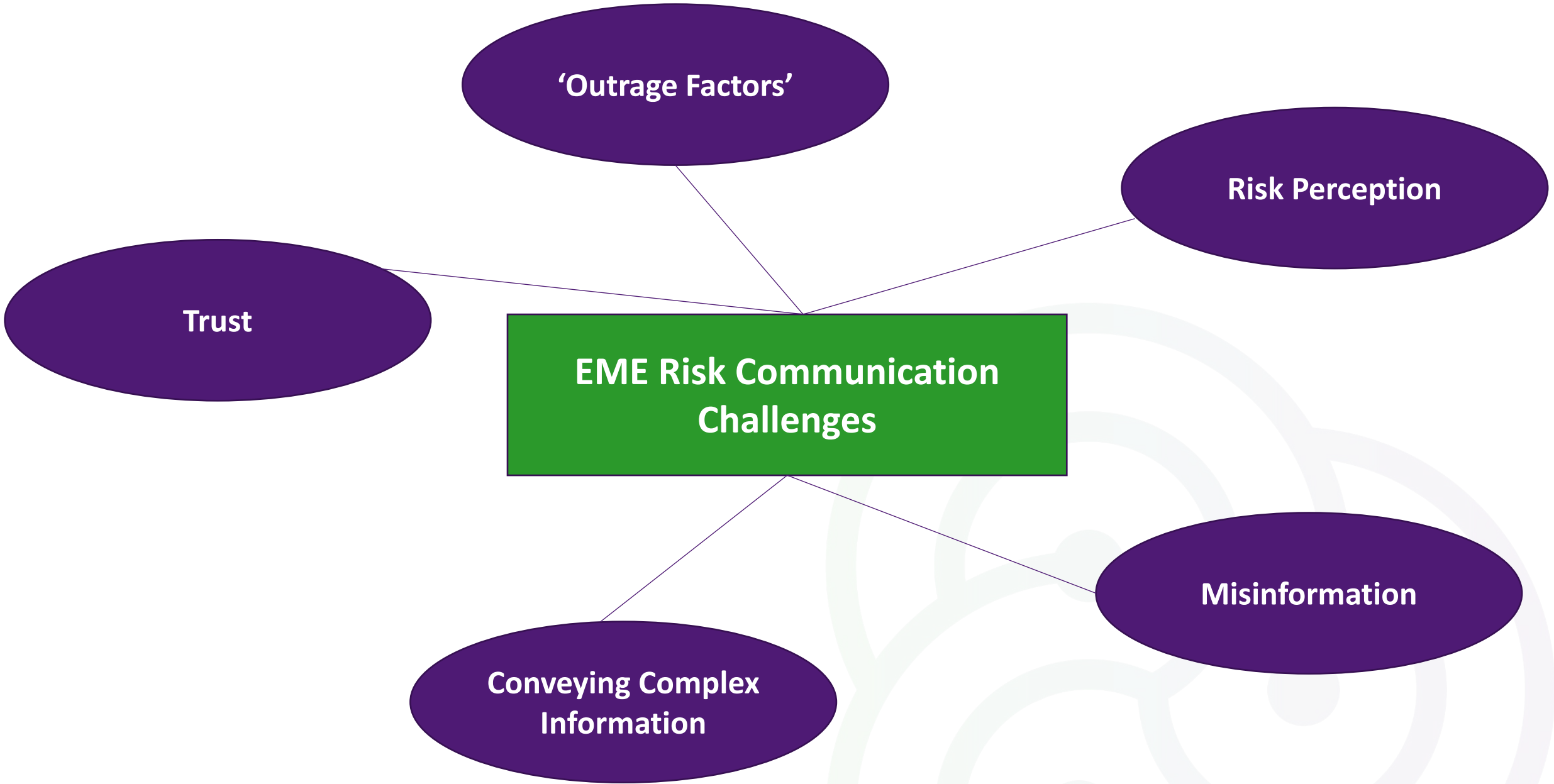


Laboratory

Risk Communication



- Avoiding misunderstandings of health risk is a major challenge in public health
- Risk communication involves providing **meaningful** and **understandable** information to diverse audiences
- Addressing community concerns, risk perception, and tackling misinformation are core to promoting the health and safety of the public, workers, and the environment
- Effective risk communication helps build ARPANSA's public profile and reputation as a trusted source of information



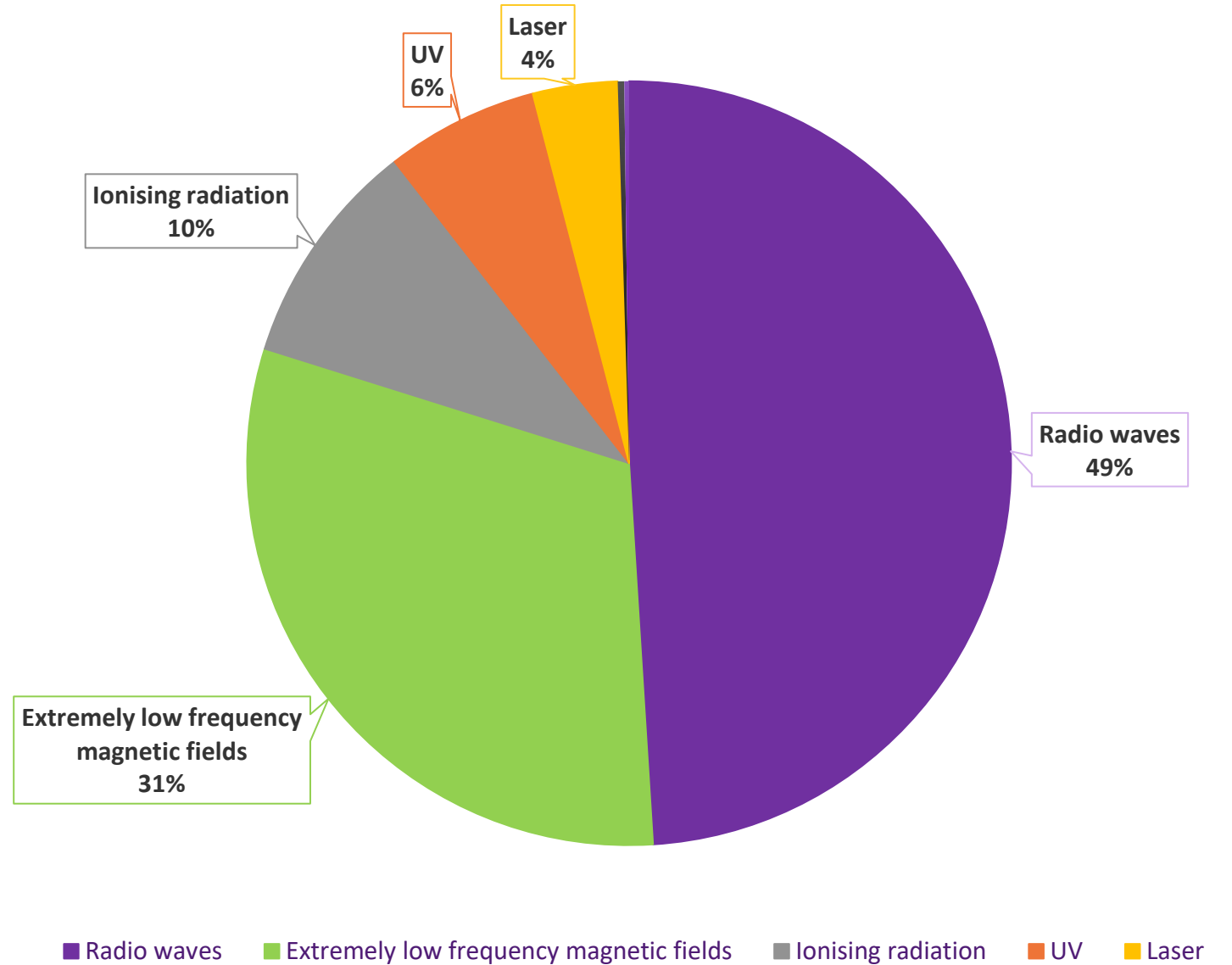
Risk Perception

Where does the biggest exposure to RF for members of the public come from?



Copyright 1968 General Artists Corporation management

Talk to a scientist enquiries by main topic



Mobile Phones vs Base Stations

- There has been 1330 Mobile phone base stations enquiries since 2012
- Yet, there has only been 163 enquiries on mobile phones despite mobile phones being used in closer proximity to the body and contributing a greater amount of RF exposure



Risk perception



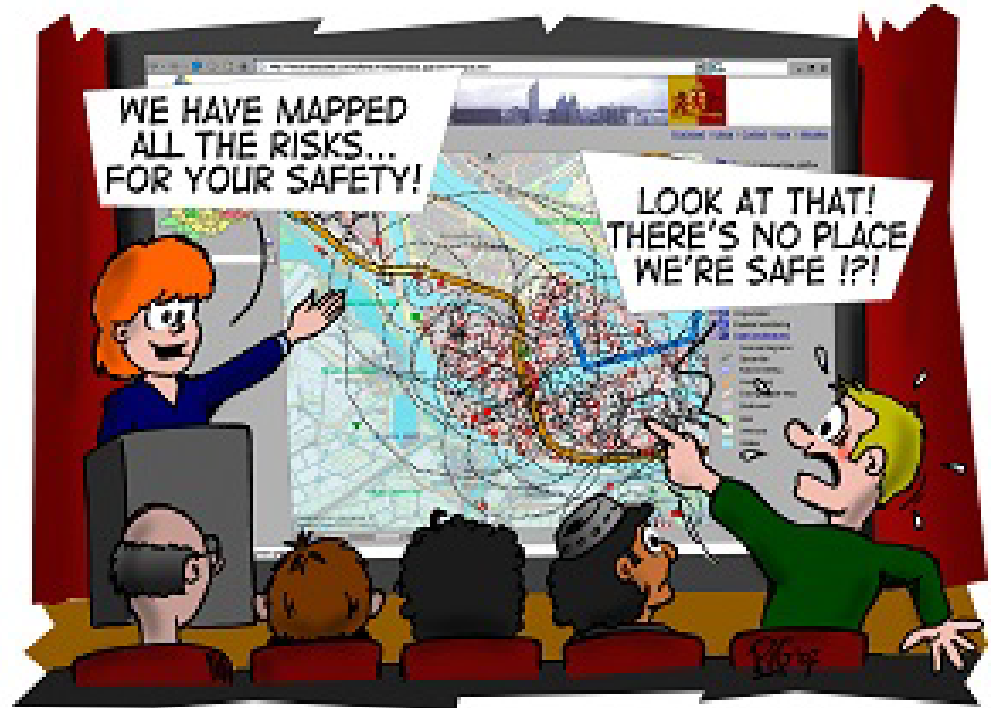
- The Public reaction to a given situation isn't necessarily a gauge of the objective risk
- Despite being greater hazards Ionising Radiation and UV have far less general public queries than RF and ELF. Why?
- Can this distortion of Risk Perception be explained by outrage factors and can this help with our risk communication?

Outrage Factors

- Sandman's Outrage Framework
- 'Outrage Factors' are certain features of a situation which tend to cause more/less public reaction
- Some common outrage factors seen amongst the common TTAS enquiries are:
 - Voluntariness
 - Controllability
 - Familiarity
 - Benefits
 - Effects on children/vulnerable subgroups
 - Trust
 - Media attention



EME Program Risk Communication Strategies



[DRM cartoons – CapaCities \(drm-capacities.eu\)](http://drm-capacities.eu)



CARTOON BY MICHAEL MITTAG, WWW.COOLRISK.COM

Talk to a Scientist



1800 000 000
Tues
11 a

Online webform



Australian Radiation Protection and Nuclear Safety Agency

17 Oct · 🌐

What makes radio waves different from infrared rays?

... See more



Australian Radiation Protection and Nuclear Safety Agency

26 Sep · 🌐

We've all heard of the placebo effect, but did you know that there is a nocebo effect?

... See more



Australian Radiation Protection and Nuclear Safety Agency

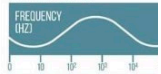
28 Sep · 🌐

Is there a relationship between mobile phones and brain cancer?

... See more

THE ELECTROMAGNETIC SPECTRUM

NON-IONIZING RADIATION



POWER LINE



COMPUTER



Communicate Early and Often and Enable Two-Way Communication

- Trust is a key element of effective risk communication
- *Acknowledging uncertainty*
 - Acknowledging what is yet unknown about a risk builds community trust and acceptance of control strategies
- *Transparency*
 - A key strategy for creating and maintaining public trust
- *Empathy*
 - Acknowledging fears, concerns, and uncertainties regardless of their basis
- *Continued commitment to the integrity of scientific research and evidence-based decision making*

Building Trust

- Ensure that our messages across all our communications strategies are:
 - Clear
 - Concise
 - Consistent
- Working together with key stakeholders to create and share consistent information

Consistency in Messaging



Australian Government

Department of Infrastructure, Transport,
Regional Development, Communications and the Arts



Australian
Communications
and Media Authority

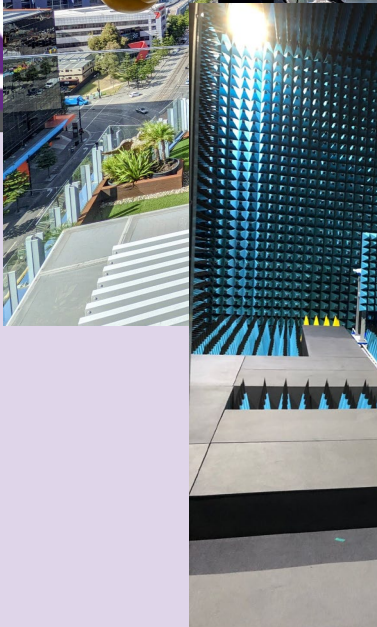
The disease has spread
alarming increase in crime
alarming high rate of base
alarmist /əˈlɑːmɪst/ alarm
1 Someone or something
causing fear or an



Addressing Misinformation

Standard for Limiting Exposure
 to Radiofrequency Fields —
 100 kHz to 300 GHz

Radiation



Karipidis et al. *Environmental Evidence* (2021) 10:39
<https://doi.org/10.1186/s13750-021-00252-w>

Environmental Evidence

SYSTEMATIC MAP PROTOCOL

Open Access

What evidence exists on the impact
 of anthropogenic radiofrequency
 electromagnetic fields on animals and plants
 in the environment? A systematic map protocol

Ken Karipidis^{1,2*}, Chris Brzozek¹, Chhavi Raj Bhatt¹, Sarah Loughran¹ and Andrew Wood³

Abstract

Background: Exposure to radiofrequency (RF) electromagnetic fields (EMF), particularly from telecommunication sources, is one of the most common and fastest growing anthropogenic factors on the environment. In many countries, humans are protected from excessive RF EMF exposure by safety standards that are based on guidelines by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The ICNIRP guidelines are based on knowledge of how RF EMF affects the human body; however, there are currently no recognised international guidelines to specifically protect animals and plants. Whether the ICNIRP guidelines for humans is adequate to provide protection to the environment is a subject of active debate. This systematic map will collate all the available evidence on whether anthropogenic RF EMF has a negative effect on plants and animals in the environment. The map will also identify gaps in knowledge, recommend future research and inform environmental and radiation protection authorities.

Methods: The proposed systematic map will include peer-reviewed and grey literature published in English. The EMF—Portal, PubMed and Web of Science databases will be searched using a search string prepared by the review team and tested for comprehensiveness against a list of known relevant reviews. Once duplicates are removed, retrieved articles will be screened in three stages: title, abstract, and full text. Studies will be selected with a subject population of all plants and animals, with exposures to anthropogenic RF EMF (frequency range: 100 kHz–300 GHz) compared to no or lower level exposure, and for all outcomes related to the studied populations. Kappa statistic tests will be conducted at each stage to ensure consistency of decision-making regarding the predefined inclusion/exclusion criteria. Eligible studies will then proceed to the data extraction phase, which will extract meta-data such as bibliographic information, taxonomic information, RF EMF exposure data, outcome(s), sample size, etc. The extracted data will then be organised into a systematic map and the findings summarised by cross-tabulating key meta-data variables in heat maps, charts or other data visualisation methods. The systematic map will identify gaps in knowledge, priorities for future research and potential subtopics for further analysis and/or systematic review.

Keywords: Anthropogenic radiofrequency electromagnetic fields, Base stations, 5G, Broadcast towers, Radar, Telecommunication, Plants, Animals, Environment

*Correspondence: ken.karipidis@arpansa.gov.au

¹Australian Radiation Protection and Nuclear Safety Agency, Melbourne, Australia

Full list of author information is available at the end of the article



© The Author(s) 2021. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. The Creative Commons Public Domain Dedication waiver (<http://creativecommons.org/publicdomain/zero/1.0/>) applies to the data made available in this article, unless otherwise stated in a credit line to the data.

Promoting and Undertaking High Quality Scientific Research

Summary

- ARPANSA's EME Program covers all aspects of EME and health – from the science to social media!
- Strong emphasis on risk communication
- Continually reviewing our approach to ensure our communication strategy remains effective and up-to-date

Acknowledgements

The EME Program Team

Health Impact Assessment

- A/Prof Ken Karipidis

Exposure Assessment

- Dr Stuart Henderson

Science Officers

- Dr Chris Brzozek
- Dr Chhavi Bhatt
- Rohan Mate

Communications

- David Sibenaler

Thank you

Email: sarah.loughran@arpansa.gov.au



ARPANSAGovernment



ARPANSA



ARPANSANews



ARPANSA