

Dirty Electricity and Electromagnetic Fields

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Presentation Overview

- What the heck is “Dirty Electricity”?
- Electromagnetic Fields
- Health effects overview from international agencies
- Review and Wrap-up

Examples of Electricity in our Homes

- Picture of Input power
- Picture of distortion caused by the things you plug in.



Note: See peaks
At 60, 180 and
300 Hz

Most “Dirty Electricity” is caused by us and the things we buy. Plug nothing in and your house will be free of this noise and very dark!

Can Science Guarantee Something is Safe?

- Science is a very powerful and established tool.
- However, science is *not infallible* and...
- It is impossible to prove the negative
- *Nonetheless it is the best tool we have for establishing the health and safety of environmental agents*
 - "By denying scientific principles, one may maintain any paradox." – Galileo Galilei

HAZARD	RISK
 Water	 Jumping in without knowing how to swim
 Gasoline	 Lighting a match
 Driving	 Texting

Can Science Guarantee Something is Safe?

- No...The best science can offer is the *presumption of safety* because:
 - It is not feasible to test every kind of exposure condition with every type of biological system (even if you could identify all of them)
 - Presumption is based on the best scientific tools and methods at our disposal today...but better ones will undoubtedly be available in the future.
- Science can identify what RF exposure conditions that do give rise to a demonstrable harmful effects, and from this information, reduction factors are applied in a safety standard to keep human exposures far below these levels.

US Standard and Your Exposure

The FCC
Regulation



100,000,000
times below

Exposure from
Wi-Fi in the
environment



3,333,333
times below

Exposure from
TV Broadcast



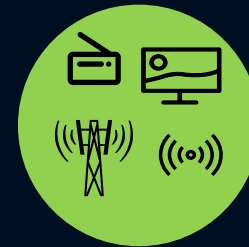
500,000
times below

Exposure from
mobile phone
base stations



50,000
times below

Exposure from
radio broadcast



30,000
times below

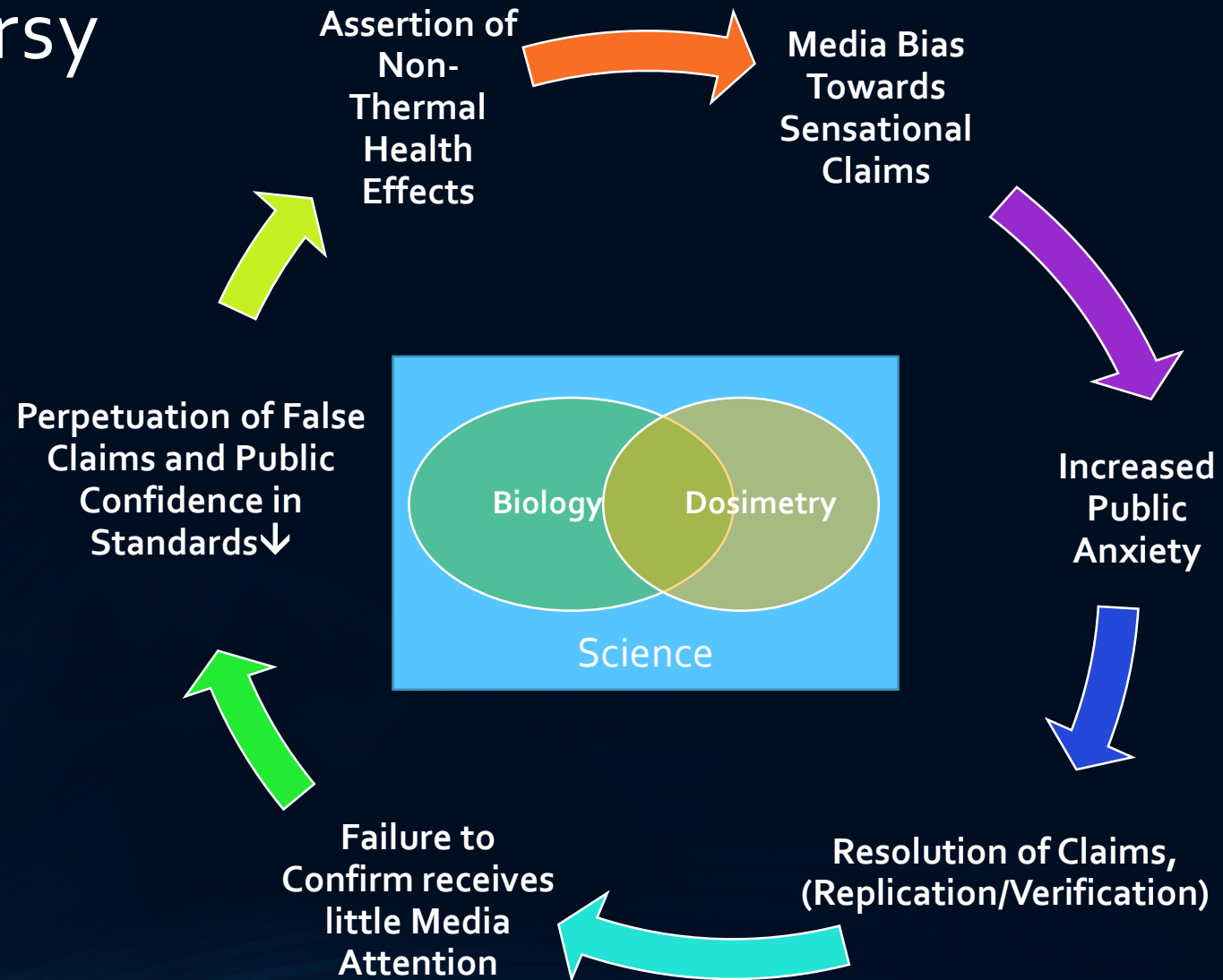
Exposure from
all sources



50
times above

Exposure level
where effects
occur

The Quality of Science is at the Center of RF Safety Controversy



Peer Reviewed Literature

- The Scientific Peer Review Process
 - Recognized world-wide in science as an essential (but not infallible) quality control mechanism
 - Typically 2-3 objective expert peer reviewers
 - Complete description of Methods and Materials (allow replication)
 - New Information ?
 - Conclusions justified from data observed ?
 - Appropriate methods ? (techniques, double blind, positive and negative controls, etc)
 - Appropriate Statistical Analysis ?
 - Appropriate Journal ?

Predatory publishing is becoming an organized industry (more than 1,000)
Not all journals created equal (Nature, Science, Cell vs....)

- International Scientific Research Organization for Science, Engineering and Technology (ISROSET)
- Open Access Science Research Publisher (OASRP)
- Pristine Research Journal Publications (PRJP)
- World Academy of Science and Technology (WAST)

Science Based Health Policy

- A single study can form the basis of a hypothesis but does not provide the basis for hazard identification. Nor do multiple studies by the same investigator.
- Confirmation of the results of any study is needed through independent replication and/or supportive studies.
- The resulting weight of evidence forms the basis for science-based judgments by defining exposure conditions that lead to:
 - Adverse health effects and
 - Threshold no observable adverse effects.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) - 2019

- The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) has returned serve to the myriad submissions made to the House of Representatives Standing Committee on Communications Inquiry into 5G in Australia that state 5G is a health threat to humans and fauna.
- "Higher frequencies do not mean higher exposure levels," ARPANSA bluntly stated in its submission.
- "Current research indicates that there is no established evidence for health effects from radio waves used in mobile telecommunications. This includes the upcoming roll-out of the 5G network. ARPANSA's assessment is that 5G is safe."
- The agency stated that while the frequencies used in 4G and 5G mean some energy is absorbed into the body, it is too low to create any "significant heating of tissue", and the higher millimetre-wave frequencies set to be used for 5G in the future do not "penetrate past the skin".
- "The power level will be low and no appreciable heating will occur in the skin," the agency said.



Electromagnetic Fields and Public Health

- “To date, all expert reviews on the health effects of exposure to RF fields have reached the same conclusion: There have been no adverse health consequences established from exposure to RF fields at levels below the international guidelines on exposure limits published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP)
 - Source: http://www.who.int/peh-emf/meetings/ottawa_june05/en/index4.html

Electromagnetic Fields and Public Health Base Stations and Wireless Technologies



Fact sheet N°304

- Summary Statement & Conclusion:
 - “From all evidence accumulated so far, no adverse short- or long-term health effects have been shown to occur from the RF signals produced by base stations.”
 - “Considering the very low exposure levels and research results collected to date, there is no convincing scientific evidence that the weak RF signals from base stations and wireless networks cause adverse health effects.”
 - Source: <http://www.who.int/mediacentre/factsheets/fs304/en/print.html>

American Cancer Society Cell Phone Towers and Health



- Do cellular phone towers cause cancer?
“Some people have expressed concern that living, working, or going to school near a cell phone tower might increase the risk of cancer or other health problems. At this time, there is very little evidence to support this idea. In theory, there are some important points that would argue against cellular phone towers being able to cause cancer.”...(Non-ionizing; Wavelength interaction limitations; Low intensity)..... “For these reasons, most scientists agree that cell phone antennas or towers are unlikely to cause cancer.”

<http://www.cancer.org/Cancer/CancerCauses/OtherCarcinogens/AtHome/cellular-phone-towers>

Health Canada (2011)

Safety of Cell Phones and Cell Phone Towers

- The IARC classification of RF energy reflects the fact that some limited evidence exists that RF energy might be a risk factor for cancer. ***However, the vast majority of scientific research to date does not support a link between RF energy exposure and human cancers.***
- “With respect to cell phone towers, as long as exposures respect the limits set in Health Canada’s guidelines, ***there is no scientific reason to consider cell phone towers dangerous to the public.***”



Source: http://www.hc-sc.gc.ca/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/prod/cell-eng.pdf

Review

- In everything we hear – consider the source.
- Scientists from around the world have been studying Non-Ionizing (NIR) radiation for decades.
- Imagine how many lives are saved every day from NIR (Cell phones, two-way radio, police-fire-ambulance radios).
- We set standards based on what we know, not what we fear.

Apologies

- I (Bob Johnson) am sorry I had to miss this lecture. I hope you found it educational.
- Please feel free to contact me with any questions – bob@emesafety.com
- Please consider putting your phone down when driving. That is a real hazard of phone use and people are injured or worse, every day.
- Credit to Dr. Jerrold Bushberg who supplied many of these slides.