

# Cancer & EM Waves

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# Summary

## Historical Parallel

Cigarettes were once seen as safe until scientific evidence proved otherwise

## Relevance Today

Electromagnetic Field exposure is increasing, and its long-term health effects remain debated.

## Scientific Evidence

Studies disagree : some report biological effects, others find weak or no clear risks.

## Overall Picture

The field is divided; more independent long-term research is needed.

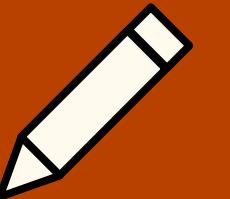
# Think About It

In the early **20th century**, cigarettes were promoted as **relaxing and elegant**, with ads portraying them as glamorous and even endorsed by doctors and celebrities.

By the **1950s**, statistical studies linked tobacco to **lung cancer** and public perception shifted.

The tobacco industry responded by funding research to show doubt and delay regulation.

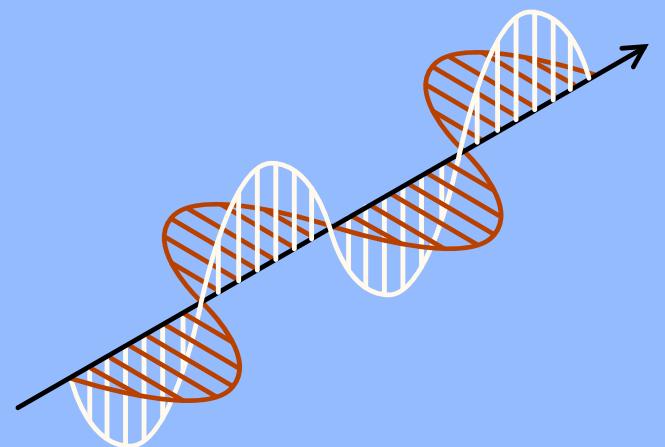
# Why this matters ?



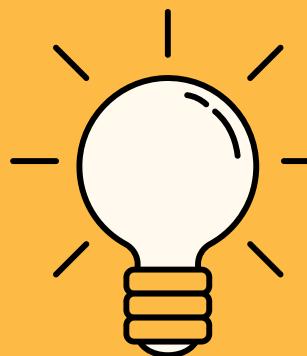
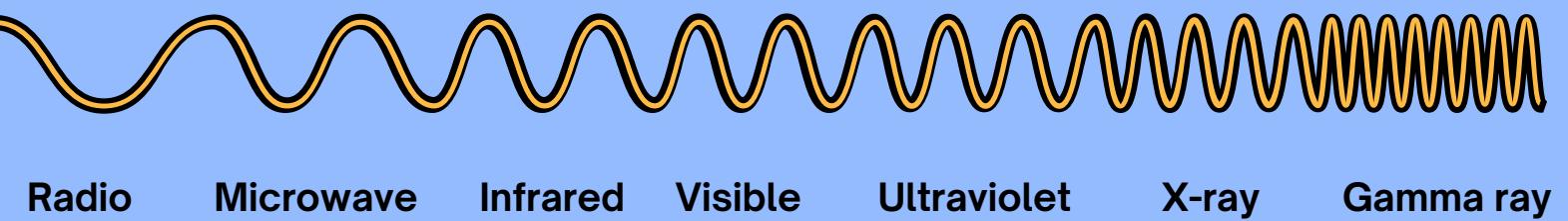
- 01** Just as early warnings about tobacco were ignored, some scientists argue that non-thermal electromagnetic radiation may have long-term health consequences.
- 02** Opponents contend that existing evidence is weak, misinterpreted or focused on extreme exposures not typical of daily life.
- 03** Understanding the balance of risks versus benefits is crucial as EMF exposures from phones, Wi-Fi and power lines continue to grow.

# Electromagnetic Waves

Electromagnetic waves consist of oscillating **electric and magnetic fields** that propagate through space.



They span a spectrum from extremely low frequency (ELF) and radiofrequency (RF) to microwaves, infrared, visible light, ultraviolet, X-rays and gamma rays.



Humans are exposed through power lines, mobile phones, Wi-Fi routers, microwave ovens and medical imaging devices.

POSITION 1 :

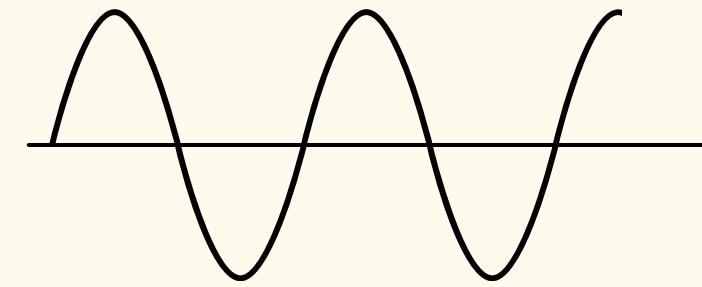
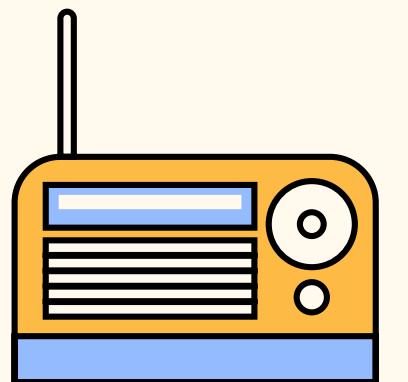
# Health risks

Many studies find non-thermal RF exposure induces **oxidative stress, DNA damage and mitochondrial dysfunction.**

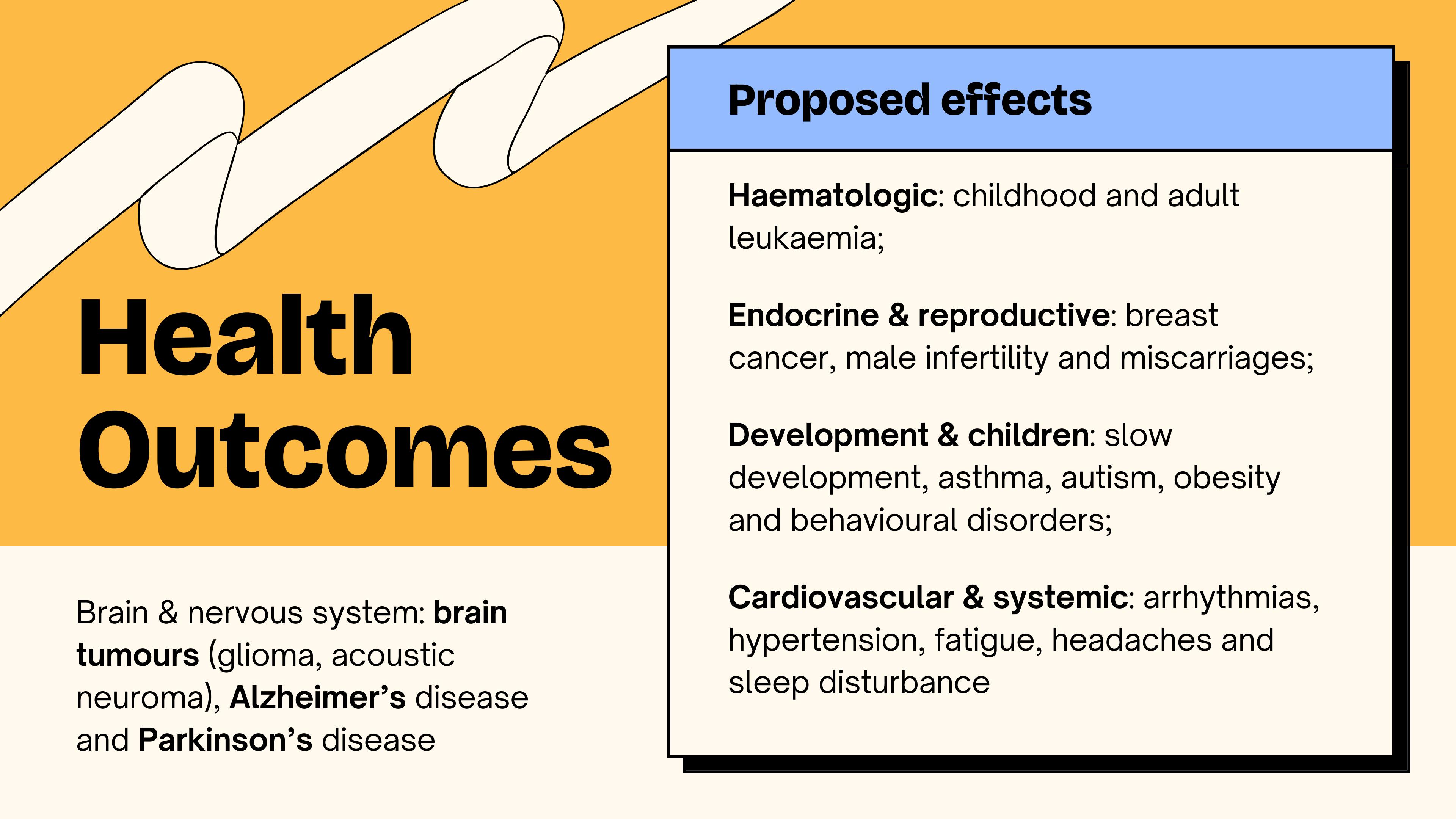
Epidemiological data show increased risk of **glioma** and **acoustic neuroma** in long-term mobile phone users.

## Other effects

EMF can mutate DNA, delay melatonin release, alter blood–brain barriers, reduce sperm counts and increase miscarriage risk; some individuals develop EMF sensitivity such as **fatigue and insomnia**.



SCHOLARS ARGUE THAT FUNDING BIASES AND INSTITUTIONAL BARRIERS DIFFICULTS RECOGNITION OF THESE RISKS.



# Health Outcomes

Brain & nervous system: **brain tumours** (glioma, acoustic neuroma), **Alzheimer's disease** and **Parkinson's disease**

## Proposed effects

**Haematologic:** childhood and adult leukaemia;

**Endocrine & reproductive:** breast cancer, male infertility and miscarriages;

**Development & children:** slow development, asthma, autism, obesity and behavioural disorders;

**Cardiovascular & systemic:** arrhythmias, hypertension, fatigue, headaches and sleep disturbance

POSITION 2 :

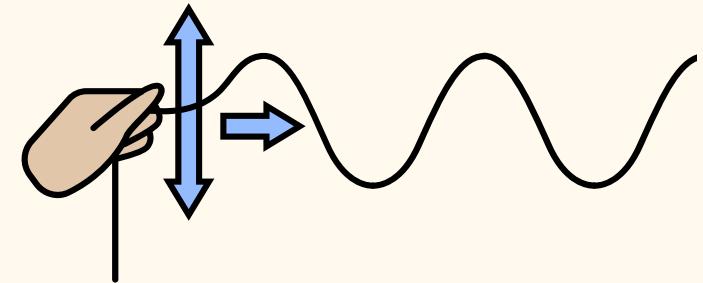
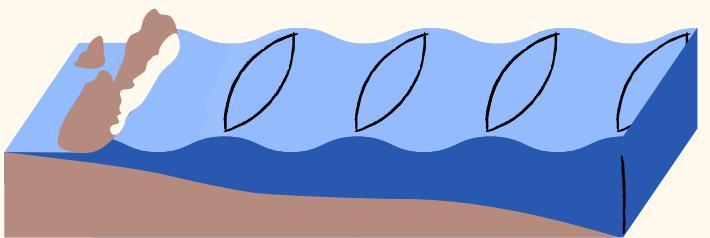
# Todays facts

Regulatory bodies note **no firm evidence** of health hazards at typical public exposure levels; **guidelines** focus on avoiding **heating effects**.

Many epidemiological studies and reviews **find weak or inconsistent associations**; there is **limited evidence** of electromagnetic-wave dangers.

## Boddy protection

Skin, skull and other tissues act as **effective shields**, and rapid **thermal dissipation** limits biological impact. EMF technologies also deliver **health benefits** (e.g., MRI, diathermy) illustrating safe use under controlled conditions.



CURRENT RESEARCH IS **INSUFFICIENT** TO CONCLUDE THAT **LONG-TERM** MOBILE PHONE USE HARMS HUMAN HEALTH

# Considerations

Realistic exposure depends on **dose, distance and duration**; exposure from mobile phone antennas increases with **proximity** and **signal strength**.

## Exposure

Epidemiological studies often rely on self-reported phone use and have small samples or poor exposure assessment, limiting conclusions.

## Boddy

Cellular experiments may show **molecular changes** but may not translate to **whole-body effects** due to homeostatic mechanisms.

# The Scientific Divide

## **"Gulf of opinions"** (Héroux P.)

- Industry-funded research : thermal
- Independent research : non-thermal

## **Decades of polarisation**

Early conflicting studies hardened views,  
each side reading the data their own way.

## **Fuel of division**

Funding sources and assumptions about  
acceptable endpoints fuel the divide



# Scientific Consensus

There is no **unified consensus**: evidence remains conflicting and **interpretations vary** across disciplines.

The International Agency for Research on Cancer (IARC) classifies RF radiation as “**possibly carcinogenic to humans**”.

Regulatory guidelines are based on avoiding thermal effects; non-thermal **bioeffects remain controversial**.



# Conclusion & Perspective

**EMFs are ubiquitous**, and a balanced view recognizes both potential risks and documented benefits.

Mixed evidence: some studies report oxidative stress and **possible cancer** or neurological effects, while others show **low penetration** and inconsistent epidemiological findings.

**Prudent approach**: reduce unnecessary exposure, support independent long-term research, and update guidelines as new evidence emerges.



# References

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# Questions ?

