

Effect of Exposure to Magnetic Fields on Pregnancy Outcomes, Health of Offspring, and Male Fertility

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Story of EMF Health Effect

- Discovery in 1979:
 - Findings by Nancy Wertheimer and Ed Leeper
 - Their incredible luck
 - Their two legacies
 - Poor EMF measurements
 - Outcome inefficient to study

History of EMF Research

- Evolution of EMF measurements:
 - Wire codes
 - Interview about occupational history
 - Distance from power lines or power stations
 - Home spot measurement
 - Personal EMF measurements (24 hours)

History of EMF Research

- Inefficient outcomes being studied:
 - Cancers
 - Childhood leukemia
 - Brain tumors
 - Other cancers including breast cancer
 - Long latency
 - Exacerbate the problem of EMF exposure misclassification

Problems with EMF Research

- Crude measure of EMF exposure
- Outcomes inefficient to study
- Mostly retrospective studies (case-control studies with surrogate measures of EMF)
- Physicists' involvement_ a mistake
 - Focus on energy
 - Other mechanisms: cell-to-cell communications
- Lack of extensive research

Misconception about EMF Health Effect

- Most studies were negative
- It has been proven safe
- Power line EMF
 - Low frequency 50-1000 Hz
- Wireless (cell phone) EMF
 - High frequencies > 1 MHz
- Power line EMF and wireless EMF different

Findings on *In-utero* EMF Exposure

- Exposure to high level of magnetic fields during pregnancy is associated with an increased risk of:
 - Miscarriage
 - Asthma in offspring
- Prospective design
- Dose-response relationship
- Synergistic effect with known risk factors
 - For miscarriage: a history of miscarriage
 - For asthma in children: maternal history of asthma and firstborn child
- Typical day: stronger association

Findings on EMF Exposure Effects on Men

- Exposure to high level of magnetic fields is associated with an increased risk of
 - Poor semen quality (abnormal motility and morphology)
- A dose-response relationship
- Typical day: stronger association