Cellphone radiation risks—the case for precaution

National Press Club
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There are few studies on cellphone radiation

Total number of epidemiological studies of cellphones and health (source: EMF Portal, 2012)

- brain cancer (75)
- leukemia/lymphoma (14)
- other cancers (e.g. mamma carcinoma, uveal melanoma) (28)
- hypersensitivity/well-being/subjective complaints (41)
- others (e.g. mortality, cardiovascular diseases) (33)
Total number of studies of children’s health and cellphones (EMF Portal, 2012)

- Childhood leukemia: 83
- Childhood lymphoma: 16
- Childhood brain/CNS tumor: 46
- Other childhood cancers: 19
- All childhood cancers: 16
- Pregnancy outcomes: 37
- Others (e.g. cognitive, performance, behaviour): 37

n=172 as of 11/11/2012
Total number of studies of young animals (source: EMF Portal, 2012)

- Teratogenicity, embryogenesis (199)
- Behaviour and cognitive processes (21)
- Central nervous system (34)
- Endocrinologic processes (7)
- Fertility (14)
- Growth (15)
- Others (145)

Total: 435 as of 11/11/2012
Models of Brain/Body show that children are most exposed to radiation from cell phones

- Based on SAM with 11 pound head 220+ lbs weight

- 5.5 billion cellphone users are mostly smaller & younger
Cell phone standards are based on a heavy-set 6 foot+ tall man.

900 MHz the SAR maximum occurs in the center of the case

(w 15 mm spacer for 10 gm)

1800 MHz SAR max occurs at edge of case, Christ et al, 2010

Images courtesy of IT’IS, 2010
Who’s Most At Risk?

These computer models from the University of Utah show how radio-frequency radiation from cell phones passes further into the brain of a child than that of an adult. Research that Dr. Om P. Gandhi and Dr. Devra Davis are currently working on indicates that children may be exposed to twice as much radio-frequency radiation from a cell phone as an adult.

Source: Brain graphics courtesy of Professor Om P. Gandhi, Univ. of Utah, photos from iStockPhoto.com
Normalized SAR for the mother and the fetus exposed to a dipole antenna in front of the abdomen (frequency is 450 MHz because of larger penetration depth (courtesy Andreas Christ and Niels Kuster, IT’IS, 2012)
SAR Distribution in the Head Models at 900MHz

- 3 year old
  - Touch
  - Tilted

- 6 year old
  - Touch
  - Tilted

- 11 year old
  - Touch
  - Tilted

- Adult
  - Touch
  - Tilted

Color scale: 0dB to -50dB
SAR Distribution in the Head Models at 1800MHz

Age Group | Position
--- | ---
3 year old | touch
3 year old | tilted
6 year old | touch
6 year old | tilted
11 year old | touch
11 year old | tilted
Adult | touch
Adult | tilted

Color Scale:
- $0\text{dB}$
- $-50\text{dB}$
Penis gets highest exposure

Precautionary Advice Issued by University of Pittsburgh Cancer Institute, 2008

- Use speakerphone
- Use earpieces
- Do not keep phone on body/in pocket
- Avoid use in areas of weak signals
- Protect abdomens--pregnant, adolescent and men wishing to become fathers

- France, Finland, Israel, and the European Environment Agency advise cellphone precautions