Potential Health Implications from Mobile Communication Systems

Short Term Mission project: Mobile & Children

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Agenda

- Goal of short term mission project
- Different working groups
- Conclusions
European COST281 project decided to identify the need for further research about EMF and children

- COST 281 project: Potential Health Implications from Mobile Communication Systems (coordination of European research)
- In Rome on May 5, 2002 a short term mission (STM) related to Mobile Phones and Children was defined
- The goal of the STM was to cover all EMF aspects of the use of mobile phones by children (from SAR to risk communication)

Objectives

- To collect publications related to mobile communication and children and to review the literature
- To determine and to report the areas where scientific knowledge is missing
- To identify potential need for additional research in this area
Six working groups have been defined:

- **WG 1**: Anatomical properties and biophysical and biochemical mechanisms in children
- **WG 2**: Dielectric properties
- **WG 3**: Dosimetry
- **WG 4**: Biological Studies
- **WG 5**: Patterns of usage of mobile phones
- **WG 6**: Risk communication to children
Extensive report “Growth in infancy and childhood with tables” from Reißenweber J., Nov 2003 (report supported by FGF)

Conclusions
- Growth of head and brains is mainly in first 5 years
- Thickness of skull is growing fast during first decade with increasing calcification (decreasing conductivity). From 10 year on a very slow growth is observed.
- Myelination is in advanced state in all subcortical areas at the end of 2nd year and slowly continues until adulthood
Results obtained
- Until recently only age-dependent results in rats are publicly available
- Dielectric constant and conductivity decreases with age ⇒ impact on absorption must be investigated

Open areas
- How to extrapolate the results to humans?
- How much variation from individual to individual?
Absorption could be different due to
- Different head shapes and sizes
- Different tissue shapes and sizes
- Different dielectric properties of tissues

Results from different research groups show contradictions due to
- Different child head models (scaled heads, MRI model)
- Different antenna models
- Different positions of antenna with respect to head models
- Different normalisation of SAR (constant power, constant current)
- Different numerical tools
Conclusions very difficult to make due to lack of new studies
- A comparison can only be done if the configuration is unambiguously defined
- More children head models required

Open areas
- Influence of age-dependent dielectric constants on SAR
- Influence of higher elasticity of child’s ear in comparison to adult’s ear (distance of phone to brains will be smaller for child’s head)
Animal studies

- More than 50 studies are published relating to exposed animals (birds, mice, rats and monkeys) prenatally and/or during early development.
  - There is a time correlation between development of the central nervous system in humans and animals, thus these results could have important implications for human CNS development.
  - Most studies used SAR levels far in excess of what result from exposure to emissions from mobile phones to adults or children.
  - There are some relevant studies using mobile telephony signals but not all were designed specifically to address CNS development.

Open areas

- Further analysis of results is needed
EEG and behaviour studies

- Over 90 studies, only limited number related to children
- Studies performed
  - EEG studies: definitively an effect is found but is hazardous?
  - Behavioural studies
    - Reaction time studies: if reaction is seen, it is a positive reaction
    - Subjective symptoms studies (e.g. TNO study): contradictory results
- No real differences between adults and children is seen
- Ethical question on using children in these studies
WG 5: Mobile usage patterns

Results

- Different reports on mobile usage patterns are collected (Recent ones must be added).
- Differences in service use (telephone, SMS, MMS, mobile internet, game playing) between children and adults have been clearly identified.
- Number of calls per day (NC) and duration of calls (DC) can lead to numbers for specific absorption per call (SAC) and specific absorption per day (SAD).
  - E.g. call duration of adolescents can be longer.

Open areas

- Distribution of NC and DC as a function of age is not available and will be very much time and culture dependent.
- If SAC and SAD are available: is there a relation to a potential health effect?
Results

- Almost nothing substantive is available with regard to EMF risk communication to adolescents and children
- Links to primers, publications, reports and websites are available in the draft report

Open areas

- Primers on health communications need to be converted in material suitable for different age groups
- An EMF risk communication strategy and material for children and adolescents are missing and need to be further developed
Conclusions

- Papers and reports have been collected in COST 281 short term mission project on Mobile & Children
- The project has been structured with 6 working groups covering all aspects with respect to Mobile phones and Children
- Open areas for further investigation have been identified
- A summary report will be presented at the next COST 281 meeting in Paris (September 22-24)
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