Renato M.E. Sabbatini, PhD

Latin American Experts Group on High Frequency Electromagnetic Radiation and Human Health

2008 Science Review

Latin America and the Caribbean

- 31 countries, 21 million km², 562 million inhabitants (8.5% of world population)
- PPP GDP: US$ 5.7 trillion
- 412 million mobile phone subscribers (11.5% of the world) in Q2 2008
- Brazil: 8.5 million km², 190 million inhabitants, 141 million subscribers (5th largest country in the world)
- Brazil: 40% area, 33% population and 34% mobile subscribers

Aims of LASR 2008

- To identify Latin American researchers, laboratories, groups and publications on HF-EMF and biological and health
- To review the current state-of-knowledge from the point of view of the region's scientists and technicians
- To identify novel research opportunities in the context of the region's priorities
- To produce information for several kinds of publics: professional, law-makers, stakeholders, governmen officers, teachers and students, mass media
- To develop an information reference center and a literature database for HF-EMF and RF in biology and health for Latin America and the Caribbean

The Expert Panel

- Dr. Renato M.E. Sabbatini (Brazil)
- Dr. Victor Cruz Ornetta (Peru)
- Dr. Gláucio Siqueira Lima (Brazil)
- Dr. Ricardo Taborda (Argentina)
- Dr. Jorge Skvarca (Argentina)
- Dr. Moacyr Lobo da Costa (Brazil)
- Dr. Michael Repacholi (Italy)
- Dr. Paolo Vecchia (ICNIRP)
- Dr. Leeka Kheifets (USA)

Organized by:

- International Center for Information and Communication Technologies and Health (CITICS). The Independent Research Group on Impacts and Applications of Mobile Communications in Health (MobiHealth)
- The Edumed Institute for Education in Medicine and Health, a non-profit R&D institution
- Director and Chairman: Prof. Renato M.E Sabbatini (Associate Professor, Medical School, Dept Medical Genetics, State University of Campinas, Brazil)

The Edumed Institute

- Not-for-profit research, development and education institution, founded 2000 by a group of researchers and professors of the State University of Campinas and University of São Paulo
- Funded mostly by state research foundations, governmental innovation funds and international foundations
- Coordinates an educational consortium composed by more than 25 universities and scientific associations and more than 10 high tech companies

Research, Innovation and Education

- Telemedicine and telehealth
- Computerized medical records
- Image processing in medicine
- Telematics and informatics and health (WHO collaboration since 1984)
- Distance education and e-learning in medicine and health
- Telecommunications and health effects, social research
- Web-based health information (Brazilian Virtual Hospital, e*pub Electronic Publications Group, etc.)
- Thematic R&D centers: behavioral neurosciences, occupational health, and others

Timeline

- Preparatory meeting, São Paulo, August 2007
- First public meeting and production of the first draft report, São Paulo, May 2008
- Support website and virtual communications center
- Third and final meeting: Rio de Janeiro, October 2008
- Submission of final review report, December 2008
- Publication expected for the first semester of 2009

LASR Communication Site

LASR Symposium

LASR 2008

I Simpósio Latinoamericano de Campos Eletromagnéticos de Alta Freqüência e Saúde Humana

Objetivos

Procurar

Objetivos

A rápida expansão e enorme taxa de crescimento das comunicações móveis que utilizam o espectro de radiofreqüência, como os telefones celulares e redes de dados sem fio, causaram uma preocupação aumentada entre reguladores do governo, políticos, cientistas, os meios de comunicação e o grande público, sobre o efeito potencial da poluição eletromagnética sobre a saúde e bem estar humanos, não só em usuários de tais tecnologias, senão também na população que está exposta continuamente aos campos ao redor de estações rádio base e pontos de acesso de rede.

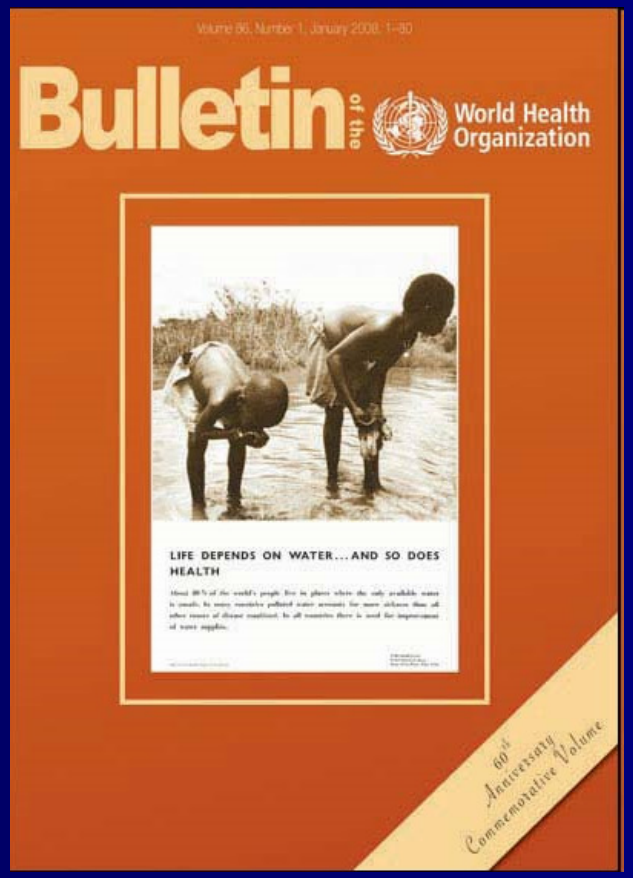
Esta preocupação motivou muitos corpos nacionais e internacionais, grupos de investigação e de estudo independentes, a avaliar a literatura cientifica, com o objetivo de encontrar provas objetivas para um efeito potencial. Milhares de papers foram publicados e examinados até agora, e a Organização Mundial da Saúde, a Comissão Internacional para a Proteção de Radiação Não Ionizante (ICNIRP) e outras organizações de grande credibilidade, realizaram muitas reuniões e revisões, publicaram relatórios, recomendaram ações e limites de segurança, etc.

Em 2007, o **Instituto Edumed para a Educação em Medicina e Saúde**, um grupo de cientistas brasileiros independentes, dedicado à investigação, desenvolvimento e educação, convocou um painel de experientes cientistas latinoamericanos com o objetivo de **produzir e publicar um relatório de consenso independente**, no qual a literatura recente sobre os efeitos possíveis dos campos eletromagnéticos de alta freqüência em biologia e saúde humanas, como aqueles usados para rádio e comunicação de TV, celulares e comunicação de dados e redes de dados sem fio, seria examinada e

Expected Products

- Science review in extended technical report format (150-180 pages, 400 selected references)
- On-line full paper literature database (for researchers only
- Publication of review(s) in peer-reviewed international journals
- Reference book in Spanish and Portuguese
- Public website
- On-line course

Main publication targets



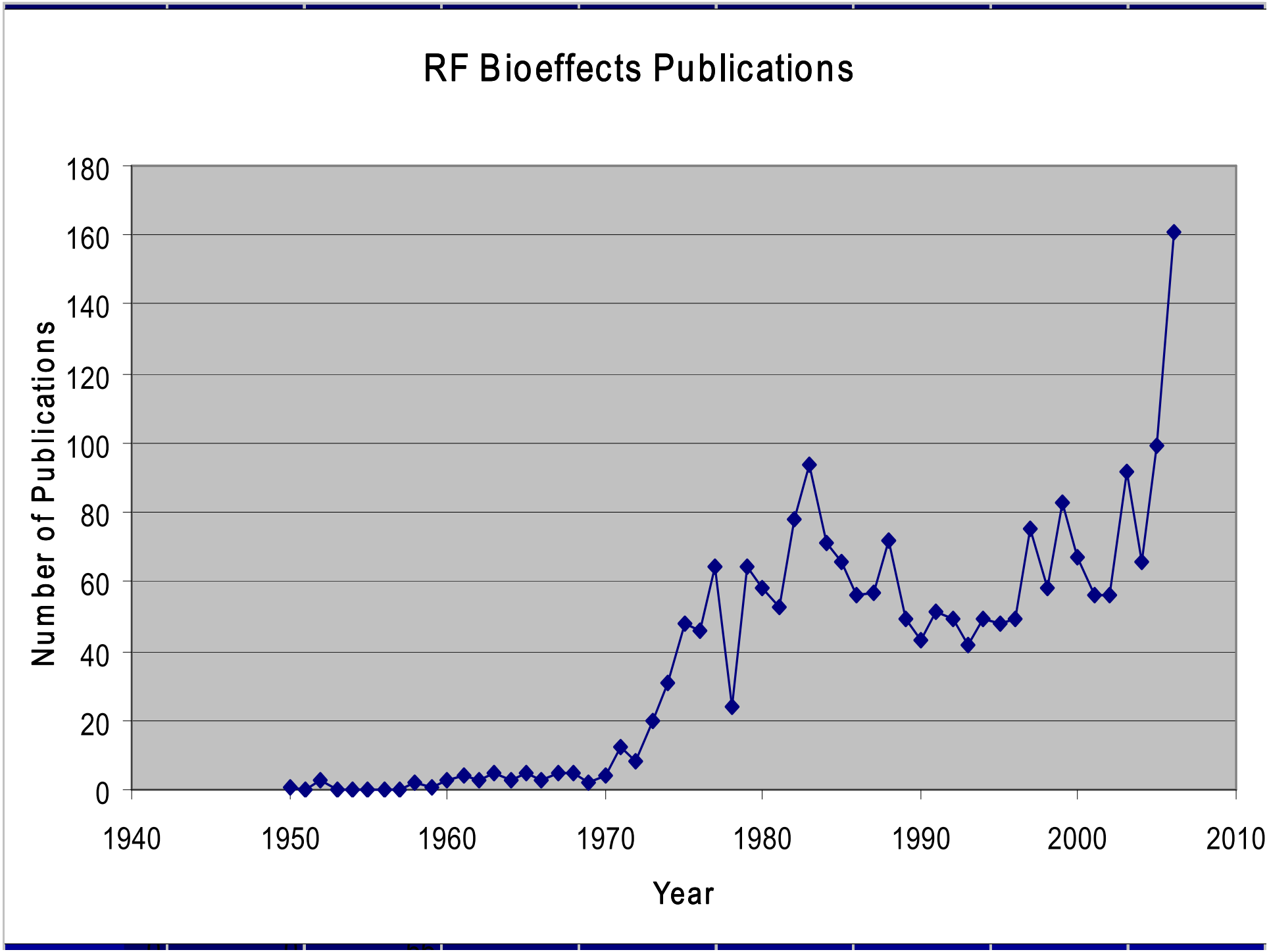
English

Spanish/Portuguese

Free On-Line Editions

Contents of the Report

- General introduction and aims
- Approaches used in this review
- An overview of EMF in Latin America
- Science review
  - Fundamentals
  - Biological mechanisms of action
  - In vitro effects
  - In vivo: animal experiments
  - In vivo: human experiments
  - Epidemiological studies
  - Indirect effects on health
  - Measurements and monitoring
  - Radioprotection and standards
  - Social research and communication
  - Final conclusions and recommendations
- References


RF Bioeffects Publications
Number of Publications
180
160
140
120
100
80
60
40
20
0
1940
1950
1960
1970
1980
1990
2000
2010
Year

Expert Scientific Reviews (1996-2007)

- Australian Committee on EM Energy Public Health Issues
- European Commission Expert Group
- European Committee on Toxicology, Eco-toxicology
- French Environmental Health and Safety Agency (AFSSE)
- Health Council of the Netherlands
- Hong Kong - Office of the Telecommunications Authority
- International Commission on Non-Ionizing Radiation Protection (ICNIRP)
- International Radiation Protection Association (IRPA)
- Japanese Ministry of Post and Telecommunications
- New Zealand Ministry of Health and Ministry of Environment
- Nordic Authorities (Denmark, Finland, Iceland, Norway and Sweden)
- Royal Society of Canada Expert Panel and Health Canada
- Singapore Health Sciences Authority
- Swedish State Radiation Protection Authority
- U.K. Advisory Group of Non Ionizing Radiation
- U.K. Independent Expert Group on Mobile Phones (Stewart Report)
- U.K. National Radiological Protection Board
- U.S. Food and Drug Administration
- World Health Organization

Initial impressions

- Extremely large and persistent literature, especially considering the feeble nature of the environmental agent and its biophysical implausibility
- Highly atypical number of negative results
- Preponderance of marginal effects
- Low methodologic quality of many epidemiological studies, which were, despite of this, accepted for publication in important journals
- Undue influence of ideologically-charged and non-neutral research groups and individuals
- Scientific controversy fueled by a very restricted number of studies
- And finally: large amounts of funding, which are denied to health care research areas with much higher importance and impact

Example: Dengue Fever

- 50 million cases and 24,000 deaths by dengue fever per year reported worldwide
- Present in more than 100 countries, 2.5 billion people at risk
- One of the leading causes of child mortality in many countries
- Easy prevention, cheap treatment
- On 18 May 2002, the WHO General Assembly confirmed dengue fever as a matter of international public health priority through a resolution to strengthen dengue control and research
- In the last 10 years: 4.666 scientific papers indexed by MEDLINE
- So far no vaccines have been developed to market, mostly due to insufficient funding and/or interest of major pharmaceutical companies
- Overall worldwide expenditure on dengue research: less than 60 million dollars

Biophysical Plausibility

- HF-EMF does not ionize atoms and damage biomolecules
- Energy levels used by telecommunication devices are too low to have a thermal effect
- Non-ionizing radiation does not have cumulative effects on living cells
- Non-thermal effects are too small and probably non significant

Conclusions of RF cell studies

- Most *in vitro* studies have not demonstrated any effects of RF exposure (SSI, April 2008)
- There is no consistent indication from *in vitro* research that RF fields affect cells at the non-thermal exposure level. (SCENIHR 2007)

Conclusions of Animal Cancer Studies

- All 29 studies since 1992 observed no significant change in tumor incidence.
- The few studies reporting effects have not been confirmed by more recent and well-designed studies with good exposure assessment.
- The weight of scientific evidence in 35 studies shows that RF exposure up to lifetime exposure (2 years) does not adversely affect carcinogenic processes (initiation, promotion or co-promotion) at whole-body SAR up to 4 W/kg.

Conclusions of Human Experimental Studies

- The majority of good quality studies have shown negative results or insignificant alterations in physiological and behavioral parameters;
- All studies on sensory systems, such as pain, vision, hearing and the vestibular systems, as well as on the endocrine and cardiovascular systems were negative;
- There are no significant effects on cognitive and behavioral parameters, except for a small decrease in reaction time;

Conclusions of Human Experimental Studies

- Although initial studies showed a mild increase of the alpha and REM frequencies, more recent and better designed studies using polysomnography could not demonstrate any effect on the EEG and sleep patterns;
- Studies using functional imaging of the brain and deep termography have shown that there is no significant heating which is caused directly by EMF irradiation either in the bone or in the brain.

Hypersensitivity to RF

- There is no valid evidence for an association between impaired well-being and exposure to mobile phone radiation presently. Seitz et al 2004
- There was no evidence that self-declared IEI-EMF individuals could detect presence or absence of RF-EMF better than other persons. There was little evidence that short-term exposure to a mobile phone or base station causes symptoms. Röosli, 2008

Conclusions of Epidemiological Cancer Studies

- There is no firm evidence for heightened cancer incidence and mortality among occupational and cell phone users under less than 10 yrs of exposure
- There are no data on long term exposure > 20 yrs
- There are insufficient data on community exposure
- There are no data on children exposure

Epidemiological Studies of Other Diseases

- Cataracts
- Reproductive risk: fertility, abortion, stillbirth, malformations, underweight
- Cardiovascular diseases
- Very few studies so far
- Low risks for the general population (RO or RR under 2, most under 1).
- Some occupational risk for specific job descriptions

Summary of Biological Effects

- The biological database established over 50 years shows no repeatable low level RF effect
- Analysis of proposed mechanisms does not support non-thermal effects at RF frequencies. Most of them could be assigned to normal biochemical responses to heat shock
- A majority of *in vivo* animal studies cannot be extrapolated to human health. Most of the early positive results of animal studies could not be reproduced

Summary of Biological Effects (2)

- The majority of human experimental studies have shown no consistent and specific effect
- There is no firm evidence for heightened cancer incidence and mortality among occupational and cell phone users under less than 10 yrs of exposure
- Serious exposure control and methodological errors invalidate most of the positive epidemiological studies
- The conclusions from reviews of the scientific database have been remarkably consistent over time confirming the safety and the basis of the current international standards

Requirements for Establishing Cause-Effect Bradford Hill Criteria

1. Strength of association
2. Intra- and inter-studies consistency
3. Specificity of the association
4. Precession of cause in relation to effect
5. Dose-response relationship
6. Biophysical plausibility
7. Consistent support from experiments
8. Analogy to other cause-effect relationships.

Criteria for Cause-Effect in Epidemiology of HF-EMF

- Strengths of association measurements usually small, close to unity, most rarely rise above 2 or 3
- A notable consistency among negative studies for several health outcomes,
- Reproducibility of positive results is low, and comparison is difficult due to large differences in study quality and methodology
- Reported risks are not specific and cover a long range of possible detrimental health outcomes
- Do not report on precession of cause in relation to effect, but when they do, it doesn't exist
- Inexistence of a dose-response relationship
- The very low levels of power density emitted and the lack of biophysical plausibility
- There is no consistent support from experiments, either in animals or humans
- An analogy to other similar, discovered cause-effect relationships, such as with ionizing radiation, has not been ascertained so far.

A Nocebo Effect

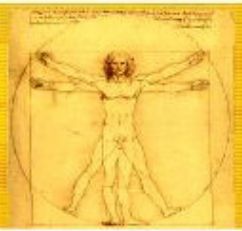
- "T*he health hazards due to the maintenance of environmental scares by false-positive studies have been neglected. The nocebo hypothesis states that expectations of sickness cause sickness in the expectant individual. Maintaining anxiety by fostering doubts in gullible populations about the quality of the environment they live in may cause serious mental illness. Anxiety caused by health scares is an increasing public health problem, which should be addressed in its own right*." Bonneaux, 2007

Information Web Site

Instituto EduMed

Centro Internacional de Tecnologias de Informação e Comunicação em Saúde

Celulares e Saúde: Mitos e Verdades



INICIO | QUEM SOMOS | PESQUISAS | SERVIÇOS | CLIENTES | FALE CONOSCO

Informações especiais:

- Governantes
- Professores
- Estudantes
- Jornalistas

Neste site você poderá encontrar informações atualizadas, sérias e confiáveis, baseadas nas pesquisas mais aceitas pela comunidade científica internacional e pela Organização Mundial de Saúde (OMS). Ele é coordenado pelo pesquisador e professor da UNICAMP, Dr. Renato M.E. Sabbatini, uma das mais respeitadas e requisitadas autoridades no assunto.

OBJETIVOS DO SITE

O rápido e enorme crescimento da telefonia celular em nosso país tem beneficiado a economia e trazido mais renda, bem-estar, conforto e segurança para milhões de brasileiros.

No entanto, para possibilitar o seu funcionamento e eficiência, é necessário que as empresas concessionárias do serviço construam em implantem milhares de antenas e torres nas cidades e no campo.

Essa proliferação, sem dúvida, tem gerado várias preocupações em parte da população. A principal delas é a dúvida se o funcionamento desses aparelhos (o telefone celular e as torres, também chamadas de **estações rádio-base**) poderia trazer malefícios à saúde, através das chamadas **radiações eletromagnéticas**

Infelizmente, existe uma falta grande de informações publicadas em português e de fácil acesso sobre esse tema. As buscas na Internet não ajudam muito, pois a qualidade e a

NOTÍCIAS

Hipersensibilidade eletromagnética não é um fenômeno real, comprova estudo alemão

Algumas pessoas alegam apresentar sintomas como cansaço, dores de cabeça, tonturas e náusea, quando falam ao telefone celular, como uma espécie de "hipersensibilidade". Agora cientistas da Universidade Justus Liebig, da Alemanha acabam de publicar um extenso estudo de dois anos, que concluiu não haver evidências científicas dessa relação com o uso do celular. Leia mais>>>

Sono de usuários de celulares não é afetado

Uma pesquisa realizada na Austrália não detectou diferenças entre a qualidade e a duração do sono de pessoas expostas a 30 minutos de transmissão de um telefone celular, quando comparadas com pessoas que não sofreram essa mesma exposição. Parece ter

EMF-RF and Health Course

Campos Eletromagnéticos Não Ionizantes e Saúde Humana

Você acessou como Renato Sabbatini em modalidade de aluno (Sair)

Edumed » CEM/Saude

Participantes
- Participantes

Últimas Notícias

27 Oct, 15:08
Renato Sabbatini
NÃ£o se esqueÃ§a do seu perfil e foto mais...
Tópicos antigos ...

Atividades
- Chats
- Diários
- Fóruns
- Glossários
- Livros
- Pesquisas de avaliação
- Questionários
- Recursos
- Tarefas

Programação

Curso de extensão universitária que tem por objetivo apresentar e discutir criticamente os principais fatos científicos relacionados a possiveis efeitos biológicos e sobre a saíde humana dos campos eletromagnéticos do espectro de 50 Hz a 800 GHz (efeitos moleculares e celulares, térmicos e não termicos, sistêmicos, epidemiologia, etc.); de uma maneira objetiva e científica.
Coordenador: Prof.Dr. Renato M.E. Sabbatini

Instituto EduMed

- Entenda o significado dos ícones

Organização do curso
- Boas vindas do professor
- Organização e dinâmica do curso
- Como estudar a distância
- Roteiro de familiarização com o site
- FAQ: Perguntas Freqüentes
- Notícias e avisos sobre o curso

Recursos de informação

EMF-RF and Health Lecture

Classe Virtual

Instituto EduMed

Inicial | Slides | Chat | Teste | Dúvida | Ajuda

Transmissão em Adobe Flash 9. Instruções para baixar e instalar
Desenvolvido por EduLogica Educação & Treinamento
Melhor visualizado em 1000 x 720
Powered by UStream

Status of HF-EMF research in Latin America

- Less than 90 papers identified, overall
- Very few active and consistent research groups
- The majority of papers are on measurements and on radiointerference with medical devices
- No research experts in the medical area, except a few in occupational health
- Biological effects: 4 papers
- Epidemiological studies not present

Occupational Physicians Survey

Opinion about the Occupational Risk of Radiofrequency Exposure
Questions marked with * are mandatory.

Experience with EMF Occupational Exposure (2)

Please continue answering if it applies to a positive answer to the previous question:

12. For how long have you had occupational health experience in the companies reported by the previous question (sum of the number of years)? *

8

13. In those companies or institutions, was there any official program for risk management and prevention which took into account the specific exposure you have indicated? *

- ○ No program at all
- ○ I can't say or don't know
- ◉ Yes, but quite a modest one
- ○ Yes, a reasonably complete program
- ○ Yes, a very complete program
- ○ Other (please specify)

14. In case one or more of the companies you have worked with had any kind of occupational program for workers exposed to RF fields, what were its SPECIFIC components? You can choose more than one. Please do not mark general protection and prevention measures which were not related to RF exposure.

- ☐ Nothing special
- ☐ Distribution of hand-outs or leaflets with information about prevention and protection
- ☑ Information in the company's intranet or internal computer network
- ☐ Short lectures or talks by the supervisor or occupational professional
- ☑ Practical training courses

Regulatory scenario

- Extraordinarily heterogeneous among and within countries
- ICNIRP standards are mostly adopted (12 countries)
- Provincial and municipal legislations with varying degrees of restriction, in absence of country-wide laws, many not science-based
- Strong negative image of base stations among the population
- High sensitivity of politicians to pressure groups

Research opportunities for Latin America

- Epidemiological studies: risk factors which are present in the region
- Personal dosimetry and monitoring networks studies
- Bioeffects of HF ranges less studied so far (ex.: THz range)
- Occupational exposure to high power HF
- Social and risk communication studies

Research needs

- Earmarked funding
- Research capacity building in several areas (eg., courses for young investigators on research techniques)
- International cooperation (fellowships, visiting researchers, multicentric studies)
- Development of the academic area of bioelectromagnetism (society, book, site, on-line forum, journal, conference, graduate course, interdisciplinary research groups)
- Insertion of curricular material on bioelectromagnetism into relevant undergraduate courses (e.g. medical physics, bioengineering, occupational medicine)

Contact

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Thank you!
Come back soon.