International Cohort Study on Mobile Phones and Health

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Presentation

- Background
- Aim of Cosmos
- Study design
- Early results
- Current state of affairs
- Outlook
Background: why Cosmos?

- Public and scientific interest in the possibility of health risks from RF from mobile phones
- Amplified by rapid penetration of mobile phones
- Uncertainties on long-term risks
- Current exposure guidelines: minimize effects of tissue heating
- Absence of any credible biological hypotheses and convincing experimental results on how low-level RF could cause disease

  → Epidemiological research important for risk identification and assessment
  → Cosmos: large prospective cohort study, long-term follow-up

Aim of Cosmos

- To establish an international cohort of ~250,000 mobile phone users initially
- To study prospectively the possible association between mobile phone use and multiple chronic health outcomes and changes in symptoms and well-being
Study Design-1

- Prospective cohort study, features:
  - mobile phone use is assessed prior to diagnosis of disease
  - objective prospective data on mobile phone use included (mobile phone operators)
  - multiple health outcomes
  - long-term follow-up (25+ years)
  - flexibility to study future changes in technology or research questions

- International pooling of data necessary to study relatively rare disease outcomes (e.g. brain tumors)

Epidemiologic Methods

PROSPECTIVE OR COHORT

TIME

F+ → D+
F- → D-

Study Design-2

Baseline (recruitment)  Follow-up

2007 - - - 2012 - - - 2017? 2030...

International cohort: 250,000+

COSMOS Questionnaire

Every ~4 Years

Data

Public Registers (Country Dependent)

On demand

Mobile Phone Usage Operator Data

Yearly

Courtesy Isabelle Deltour
Mobile phone use

- Self-reported use
  - Baseline questionnaire: historical usage, past 3 months
  - Follow-up questionnaire (every ~4 years): current use, new technologies
  - Hands free use, preferred side of the head during mobile phone use
  - Other relevant RF exposures, e.g. cordless phone, wireless computer networks

Mobile phone use

- Supplemental Operator data, including:
  - Current use at baseline and during follow-up
    - preferably covers the same 3 month period as in questionnaire
  - Number and duration of incoming and outgoing voice calls
  - Technical features (IMEI, frequency band used: 800 or 1800 MHz or UMTS), and in some countries:
    - Total data transfer (kilobytes)
    - Location of first base station concerned
Health outcomes of interest

- A priori defined based on:
  - No seemingly plausible biophysical or biological mechanism known
  - RF from mobile phones is mostly absorbed by the head, yet include the possibility that other tissues could be affected

- Registries, e.g.:
  - Cancer incidence: brain tumours, leukemia, skin cancer
  - Neurological diseases: Alzheimer, other dementia, MS, ALS, Parkinson
  - Cerebrovascular disease

- Self-reported, e.g. changes in:
  - Headache (HIT-6)
  - Migraine (ID-migraine)
  - Sleep problems (MOS-Sleep)
  - Well-being (SF12)
Recruitment strategies

- Random sampling from subscriber lists of operators, stratified by call time and, in some countries, age, sex, and region (DK, SWE, UK, FIN)

- Embed Cosmos in running prospective cohort studies (NL)

Response: pilot studies & 1st launches

- Response % (questionnaire + informed consent):
  - Pilot studies: UK 5%; Finland 9%-13%; Sweden 15-24%
  - Main launch: Denmark 9.6-18%; Sweden 20%; 10-12% Finland

- Fairly low participation rates: what does this mean?
  - Increase in costs for recruitment
  - Less of a concern for the internal validity in prospective cohort studies
  - Might affect statistical power if participation is correlated with exposure, but early results indicate that this is not the case.
Early results: use of wireless devices
(baseline questionnaire, restricted to 1st launches)

<table>
<thead>
<tr>
<th></th>
<th>Denmark (N=18,196)</th>
<th>Sweden (N=33,507)</th>
<th>UK (N=231)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weekly use of mobile phone</td>
<td>89%</td>
<td>89%</td>
<td>96%</td>
</tr>
<tr>
<td>Use of hands-free sets(^a)</td>
<td>6%</td>
<td>6%</td>
<td>29%</td>
</tr>
</tbody>
</table>
| Cordless phone
- At home                 | 63%                | 85%               | 83%        |
| - At work                 | 23%                | 33%               | 13%        |
| Wireless LAN              | 47%                | 46%               | 59%        |
| Internet calls\(^b\)      | 14%                | 8%                | 30%        |

\(^a\): Use 50% or more of the time.
\(^b\): In Denmark use within past 3 months, in Sweden and UK timeframe not specified.

Source: Schüz e.a. Cancer Epidemiology 2011:35;37–43

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Early results: weekly mobile phone voice use (baseline questionnaire, 1st launches)

Source: Schüz e.a. Cancer Epidemiology 2011:35;37–43

Fig. 1. Weekly mobile phone usage among the international cohort of mobile phone users (Cosmos), by age and amount of self-reported voice usage, enrolled to date by Denmark (a), Sweden (b) and UK (c).
Current state of affairs

- Recruitment: almost finished in participating countries:
  - Denmark (2007+2009) ~ 30k respondents
  - Sweden (2008+2009) ~ 50k respondents
  - UK (2009+2010) ~ 70k respondents
  - Finland (2009+2010+11) ~ 15k respondents
  - The Netherlands (2011+12) ~ 70(-90k) respondents
  - Total ~ 230-250k

- In France: Feasibility study ongoing

Outlook

- Development of follow-up questionnaire: to be launched from 2012 onwards (i.e. ~4 yrs after baseline)
- Baseline data: cleaning ongoing, building towards an analytical dataset for international analyses
- Development of ‘hybrid exposure model’ to characterize individual mobile phone use
- Possible extension to other countries? (e.g. France?)
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