Evaluation of RF general population exposure - a pilot study in France (Besançon, Lyon)

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**Objectives**

- Characterise RF exposure levels on a general population basis
- Evaluate the importance of different exposure sources in our general and personal environment
- Identify, if possible, the main factors which may predict exposure levels

**Design**

- Population based survey – pilot study
  - Only 10 RF exposure meters and short time period
  - ... cannot provide a full assessment / mapping of exposures in the French population
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Two complementary study regions

- Besançon
  - 120,000 inhabitants;
  - no UMTS;
  - immediately surrounded by rural areas from which many workers commute daily (by train or car);
  - Density of RF sources much less than Lyon

- Lyon
  - Much more densely populated - 1,200,000 inhabitants
  - Very large urban area
  - With subway and tramway
  - UMTS being deployed
  - Much greater density of RF sources

... allow the study of urban/rural contrasts, density of population, public/individual transportation means
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Design

• Study period
  - Test period – June-August
  - Field work
    - from September 2005 – once authorisation from ethical review and institutional review boards
    - 20 weeks

• Number of samples
  - 24 hour measurements – 400 (200 per city)
  - 1 week measurements – 40 (20 per city)

• Stratified sample
  - Urban/rural ratio: 75% / 25%
  - Age: Children (12 years or more), students, adults
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**Organisation**

- Subjects chosen at random
- Contacted to
  - Inform about the study
  - Enquire about whether appropriate person in the household (children, students, etc.)
  - Enquire about willingness to participate (informed consent)
- Measurement protocol
  - RF exposure meter and a brief questionnaire and diary will be delivered to participants
  - Use of meter and diary will be explained
  - Exposure meter and documents will be collected 24 hours (1 week) later
  - Information will be downloaded from the exposure meters
  - Exposure meters reset and battery charged
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Data available for analysis

- Exposure meter recordings
- Questionnaire about occupation and general habits
- Diary (by 15 minutes over the monitoring period) indicating location of subject, moving/stationary, use of mobile phone, etc.
- Position of base stations and radio and television emitters – using GIS coordinates of participants’ homes and workplaces
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Data analyses

• Geographical analyses: crude map of exposures in Besançon and Lyon.
• Multivariate regression analyses: to determine the effects, on the measured exposures of:
  - location of individual with respect to RF sources (at home and at work)
  - Means of transport
  - Use of mobile phones and microwave ovens

Outcome

• Assistance in planning of new, better targeted exposure assessment studies
• Assistance in characterisation of exposure distributions for the planning and feasibility assessment of analytical epidemiological studies

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