HEALTH RISK ASSESSMENT

INDIVIDUAL EXPOSURE TO RADIO FREQUENCY ELECTROMAGNETIC FIELDS: PRELIMINARY RESULTS FROM QUALIFEX

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Objectives: Exposure to various sources of radio frequency electromagnetic fields (RF EMF) is common in industrialized settings, for example from mobile phones or broadcast transmitters. We assessed exposure to RF EMF in volunteers to gain a better understanding of exposure levels and to quantify the contributions of different sources.

Methods: Exposure was assessed using the EME SPY 120 personal exposure meter (Antennessa, Brest, France), which allows separate measurements of the following frequency bands of RF EMF: radio transmitters, television transmitters, TETRA (radio communication for authorities), mobile phone handsets (uplink), mobile phone base stations (downlink), cordless phones and wireless LAN. A total of 34 volunteers living in Basel (Switzerland) and surroundings carried a personal exposure meter during one week and completed a diary of daily activities at the following locations: "at home", "at the working place", "on the way" and "other". Nine persons living close to a mobile phone base station were specifically asked to participate in the study and treated as the highly exposed group. The reference group consisted of 25 unselected volunteers. Measurements were taken every 90 seconds. To allow for values below the detection limit of 0.05 V/m, mean values were calculated by means of the robust ROS method, which assumes that measurements below the detection limit follow a lognormal distribution.

Results: Overall, the mean (range) exposure to RF EMF over the whole week was 0.20 V/m (0.09-0.40 V/m). In the highly exposed group the mean was 0.27 V/m compared to 0.17 V/m in the reference group (Wilcoxon rank-sum test: $p = 0.004$). Radio transmitters contributed 2%, television transmitters 2%, TETRA 0%, mobile phone handsets 31%, mobile phone base stations 36%, cordless phones 24% and wireless LAN 6%. At home, exposure (mean 0.19 V/m) was mainly due to mobile phone base stations (48%) and cordless phones (36%), at work (mean 0.22 V/m) due to mobile phone handsets (46%) and wireless LAN (26%), and on the way (mean 0.32 V/m) due to mobile phone handsets (68%) and mobile phone base stations (20%). In the reference group, cordless phones were

the most important source of exposure at home (60%) for people owning a cordless phone. In the highly exposed group, the mobile phone base stations contributed 65% to their exposure at home and 57% to their total exposure.

Conclusions: The median total exposure (0.20 V/m) is well below the standard limits. Major sources include mobile phone base stations, handsets and cordless phones. This study will be extended to a sample of 200 volunteers to determine the most relevant predictors of total personal exposure, according to different lifestyles. The data will allow modelling of personal exposure in the large-scale QUALIFEX cohort study (see www.qualifex.ch), which will examine non specific symptoms of ill health and exposure to RF EMF.