Personal RF-EMF exposure of Swiss adolescents

Katharina Roser* (1),(2), Anna Schoeni (1),(2) and Martin Röösli (1),(2)
(1) Swiss Tropical and Public Health Institute, Basel, Switzerland
(2) University of Basel, Basel, Switzerland

The HERMES (Health Effects Related to Mobile PhonE use in adolescentS) study, a cohort study conducted in Central Switzerland, aims to prospectively investigate whether the exposure to radio frequency electromagnetic fields (RF-EMF) emitted by mobile phones and other wireless communication devices affects cognitive functions or causes behavioural problems and non-specific health disturbances in adolescents. For investigating effects of RF-EMF in epidemiologic studies the exposure assessment is a crucial part. In the framework of the HERMES study personal RF-EMF measurements in 95 adolescents were conducted. The adolescents carried an exposimeter, a portable measurement device, for on average 2 days and 8 hours. Additionally they filled in a time-activity diary installed as an application on a smartphone in flight-mode and GPS was continuously recorded by the smartphone. The used exposimeter Expom measures 13 frequency bands ranging from DVB-T (Digital Video Broadcasting – Terrestrial, centre frequency of 620 MHz) to WiMax (Worldwide Interoperability for Microwave Access, 3500 MHz). These measurements allowed describing the RF-EMF exposure in everyday life of Swiss adolescents.

Overall the total RF-EMF exposure over the whole measurement period was on average 0.069 mW/m². Highest exposure was measured for the uplink (transmission from mobile phone handsets to mobile phone base stations) exposure with on average 0.047 mW/m², followed by downlink (transmission from mobile phone base stations to mobile phone handsets) with 0.013 mW/m², exposure from broadcast transmitters with 0.004 mW/m², WLAN (Wireless Local Area Network) with 0.002 mW/m² and DECT (Digital Enhanced Cordless Telecommunications) with 0.0004 mW/m². Regarding different activities and locations the adolescents’ exposure was highest when spending time in public transport and cars (0.940 mW/m² in cars, 0.753 mW/m² in trains and 0.696 mW/m² in buses). The exposure outside was 0.142 mW/m² and the lowest exposures where measured in school (0.056 mW/m²) and at home (0.028 mW/m²).

In conclusion other people’s mobile phones and mobile phone base stations contribute most to the total exposure and adolescents are highest exposed when travelling in public transport and in cars.