Principal Investigator

Dr. Mireille Toledano

Address

Imperial College London, Epidemiology and Biostatistics, St Mary's Campus, Norfolk Place, London W2 1PG

Summary of research:

Mobile phone, Noise, Air Pollution, Health

Application Lay Summary:

1a: The aim is to evaluate the relationships between multiple environmental exposures (electromagnetic fields (EMF) including radio-frequency EMF (RF-EMF) from mobile phones, noise and air pollution) and a range of health outcomes, including:

- self-reported health (well-being, sleep, headaches)
- cognitive function (reaction time, working memory)
- social and psychological factors (social support, isolation, depression)
- physical measures (anthropometry, cardiovascular- and respiratory measures, bone densitometry, spirometry)
- clinical markers involved in cardiovascular disease, bone health
- chronic disease outcomes including cancers, cardiovascular disease, respiratory health, and fractures.

We also aim to conduct parallel and pooled analyses on UK Biobank and UK COSMOS cohorts.

1b: We are exposed to EMF, noise and air pollution everyday, and whilst risks associated with environmental exposures are generally small, the burden on population health may be large. There is growing evidence that exposure to RF-EMF, noise and air pollution affects human health and well-being, but examined in isolation. This research will investigate these 3 exposures together – because they all potentially impact on specific health outcomes, e.g. cognitive function, headaches and cancers. The research aims to improve the evidence base on combined effects of multiple environmental exposures regarding EMF, noise and air pollution.

1c: We will examine environmental exposures (EMF, noise and air pollution) and measures of health/well-being, whilst taking into account factors that might affect that relationship such as age, sex, socioeconomic status and lifestyle factors. Where positive associations are found we aim to combine effects from multiple exposures to ascertain overall risk.

Utilizing both the UK Biobank and UK COSMOS cohorts gives this proposal several novel advantages: validation of findings in a large independent cohort; additional objective data from each cohort to improve exposure assessment/health outcome definitions; and increased statistical power.

1d: This research will include the full cohort.

We propose to enhance this analysis by adding in genetic risk scoring, in order to investigate potential effect modification of exposure (mobile phone use) by genetic risk score for BMI. We will calculate an individual genetic risk score for each participant, as per previous research (Warren et al 2017*), based on single nucleotide polymorphisms (SNPs) previously identified from GWAS as being associated with BMI, obesity or fat metabolism. The genetic risk scores will then be incorporated into the current epidemiological analysis.