



ENVIRONMENTAL
HEALTH
PERSPECTIVES

ehponline.org

Does Short-Term Exposure to Mobile Phone
Base Station Signals Increase Symptoms
in Individuals who Report Sensitivity to
Electromagnetic Fields? A Double-Blind
Randomised Provocation Study

Stacy Eltiti, Denise Wallace, Anna Ridgewell,
Konstantina Zougkou, Riccardo Russo,
Francisco Sepulveda, Dariush Mirshekar-Syahkal,
Paul Rasor, Roger Deeble, and Elaine Fox

doi:10.1289/ehp.10286 (available at <http://dx.doi.org/>)
Online 25 July 2007



NIEHS
National Institute of
Environmental Health Sciences

National Institutes of Health
U.S. Department of Health and Human Services

Does Short-Term Exposure to Mobile Phone Base Station Signals Increase Symptoms
in Individuals who Report Sensitivity to Electromagnetic Fields? A Double-Blind
Randomised Provocation Study

Stacy Eltiti, Denise Wallace, Anna Ridgewell, Konstantina Zougkou, Riccardo Russo,
Francisco Sepulveda, Dariush Mirshekar-Syahkal, Paul Rasor, Roger Deeble,
Elaine Fox

University of Essex, Wivenhoe Park, Colchester, Essex, CO4 3SQ, United Kingdom

Correspondence to:

Dr. Stacy Eltiti

Department of Psychology, University of Essex, Wivenhoe Park, Colchester, Essex,
CO4 3SQ, United Kingdom

Phone: +44 (0) 1206873784

Fax: +44 (0) 1206873801

e-mail: seltiti@essex.ac.uk

Acknowledgements:

We would like to thank all of our participants, especially IEI-EMF individuals, for their contribution to our study; also to Red-M for supplying the exposure system, and the National Physical Laboratory for the screened rooms and independent measurements. Project funded by the MTHR grant number RUM 20. All authors declare no conflict of interest. The views expressed in this paper are those of the authors and not necessarily those of the funders.

Article descriptor: Risk Assessment or Population Health

Running title: Mobile Phone Base Stations and Well-being

Keywords: base station, electromagnetic fields, electromagnetic hypersensitivity, mobile phone, well-being

Abbreviations:

GSM – Global System for Mobile Communications operates at 900MHz and 1800MHz.

IEI-EMF – idiopathic environmental intolerance with attribution to electromagnetic fields is a condition in which an individual is experiencing non-specific symptoms and attributes the cause of these symptoms to exposure to electromagnetic fields.

rf-emf – electromagnetic fields are electric and magnetic energy fields that surround any electrical device that are closely interrelated; therefore, they are usually referred to as electromagnetic fields. Electromagnetic fields within the radio frequency range are referred to as radio frequency electromagnetic fields.

UMTS – Universal Mobile Telecommunications System operates at 2100MHz.

Outline of Manuscript

Abstract

Introduction

Methods

 Participants

 Design

 Materials and Equipment

 Screened Room

 Exposure System

 Subjective Well-being

 Physiological Measures

 Procedure

Results

 Exposure

 Biographical Information

 Visual Analog Scales

 Symptom Scales

 Physiological Measures

 On/Off Judgements

Discussion

References

Tables

Figures

Abstract

Background: Individuals with Idiopathic Environmental Illness with attribution to electromagnetic fields (IEI-EMF) believe they suffer negative health effects when exposed to electromagnetic fields from everyday objects, such as mobile phone base stations.

Objectives: This study utilized both open provocation and double-blind tests to determine if sensitive and control individuals experience more negative health effects when exposed to base station-like signals compared to sham.

Methods: 56 self-reported sensitive and 120 control participants were tested in an open provocation test. Of these, 12 sensitive and 6 controls withdrew after the first session. The remainder completed a series of double-blind tests. Subjective measures of well-being and symptoms, as well as physiological measures of blood volume pulse, heart rate and skin conductance were obtained.

Results: During the open provocation, sensitive individuals reported lower levels of well-being in both the Global System for Mobile Communication (GSM) and Universal Mobile Telecommunications System (UMTS) compared to sham exposure, while controls reported more symptoms during the UMTS exposure. During double-blind tests the GSM signal did not have any effect on either group. Sensitive participants did report elevated levels of arousal during the UMTS condition, while number or severity of symptoms experienced did not increase. Physiological measures did not differ across the three exposure conditions for either group.

Conclusions: Short-term exposure to a typical GSM base station-like signal did not affect well-being or physiological functions in sensitive or control individuals.

Sensitive individuals reported elevated levels of arousal when exposed to a UMTS

signal. Further analysis, however, indicated that this difference was likely to be due to the effect of order of exposure rather than the exposure itself.