**National activity report – ISRAEL 2017**

**General Research Activities related to EMF**

- **Wi-Fi measurements** - In 2016, the Ministry of Environmental Protection and Hadassah Academic College conducted research work based on field measurements regarding *how to adequate measure Wi-Fi exposures*. The main conclusion was that it is advisable to measure both the peak and the average exposure and to use a high rate response measuring probe. In 2017, guidelines for measurement of radiation in educational institutions were updated accordingly.
- **MOBI–KIDS study** - The Cancer & Radiation Epidemiology Unit, the Gertner Institute is one of 16 study groups of this international case-control study. The study, launched in 2009, *aims to examine the association between mobile phone use and other communication devices and risk of developing brain tumors among children & adolescents.* The data collection of this study has been finalized and data analysis has been conducted.
- **GERoNiMo study (Generalized EMF Research using Novel Methods)** - The Cancer & Radiation Epidemiology Unit is participating in an international study that involves 19 research institutes from 13 countries. The study, launched in 2014, *aims to close knowledge gaps on health effects of EMF and to suggest ways to reduce exposure*. In this framework, the objectives of the Mobi-Kids epidemiological study were expanded to assess exposure to IF (in addition to RF, ELF). The Cancer & Radiation Epidemiology Unit took part in 4 (out of 10) work packages.
- **Possible effects of fetal exposure to MRI on neurodevelopmental, behavioral & hearing outcomes** - This historical prospective study is conducted by the Cancer & Radiation Epidemiology Unit. Following a feasibility study, data collection has started in 2017. The study population for this cohort survey is comprised of children who were exposed prenatally to MRI and individually matched unexposed group. Data is being collected from medical records and from a structured maternal telephone interview.
- **Possible association between childhood exposure to MRI and cancer incidence** – This historical prospective study is conducted by collaboration between the Cancer & Radiation Epidemiology unit and the Clalit HMO research institute. In this study, cancer incidence rates will be compared between a group of individuals who underwent MRI examination in childhood and a group comprising of randomly sampled unexposed children. The relative risks for cancer development will be controlled for performance of CT scans and other potential risk factors.
- **Power Frequency Magnetic Fields in Computer Classrooms in Schools** - A study conducted by the Soreq Nuclear Research Center. *The aim of the study was to measure the Magnetic Fields (MFs) in computer classes in schools.* Measurements were performed near 222 computers in 3 schools. For each computer and Operation Conditions (OC) the Whole Body Average (WBA) as well as the differences between each Measurement Points and the corresponding WBA were calculated. Background levels were divided into two groups: in 9 classes, the WBA MFs were negligible (averages and medians <0.25mG, STD<0.2mG), and in 3 classes they were a bit higher (averages and medians in the range 0.7-1.2mG, probably due to "net currents"); in 2 of these classes the average background diminished to 0.1-0.2mG when the lights were turned off. In 11 classes, the average of the differences between the measured MPs and their corresponding calculated WBA was ≤0.1mG (STD<0.2mG), indicating very homogenous fields. Only in one class, the average of the differences between the head exposure and the WBA was +0.1mG, while the average legs - WBA difference was -0.3mG. In 10 classes, both connecting the computers to the mains and turning them on resulted in negligible changes in the medians of the WBA (≤0.1mG), and the fields remained homogenous (averages and medians of the differences between all MPs and the WBA≤0.1mG). In one class, connecting the computers to the mains doubled the median WBA from 0.68mG to 1.35mG, while the medians at the legs and the hands increased by 1.4mG and 0.5mG, respectively. These increases resulted from AC adaptors located in a drawer behind the monitors. In another class, turning on the computers increased the median WBA slightly (+0.18mG), mainly due to an unexplained increase at the hands and the legs.
- **24h Personal Monitoring of Exposure to Power Frequency Magnetic Fields in Adolescents -** A National Survey, conducted by the Soreq Nuclear Research Center. *The aim of this exposure*

*assessment study was to gain information about the exposure levels of adolescents in Israel to power frequency (50Hz) magnetic fields (MF) through personal monitoring, and to provide reliable data for national policy development.* 84 adolescents, 6-10th grade students, carried an EMDEX II meter attached to their body for 24h. The students documented their activities and microenvironments, such as apartment (awake or asleep), school, transportation, open public areas and other indoor environments. The Geometric Mean (GM) of the daily Time Weighted Average (TWA) of all the participants was 0.059 μT (STD = 1.83 Fields were lowest at school [GM 0.033μT]), and average outdoor exposures were higher than indoor ones. 3.6% of the participants were exposed to daily TWA above 0.2μT. The typical time spent above 0.2μT ranged from few minutes to few hours. The time spent above 0.4μT and 1μT were much shorter, around 1-15min and from few seconds to 2min, respectively. Momentary peaks ever recorded were in the range of 0.35-23.6μT. *These results indicate that exposure of adolescents in Israel is similar to data reported in other countries, being below 0.1μT for the vast majority, with very few average exposures above 0.2μT.* Analysis of the different microenvironments allows for a cost-effective and equitable policy development *(published in: Environmental Research, 158: 295-300, 2017)*.

- **Public perception of non-ionizing radiation in general and from Wi-Fi in particular -** This ongoing study is conducted by the Faculty of Education in Science and Technology in the Israeli institute of technology, "Technion". *Its aim to learn more about attitudes towards the issues of Wi-Fi radiation in schools, both from the media and parents' perspective.* To achieve this goal, the study utilized complementing methods: analysis of news items, social media discussions and TV programs to learn about the different ways NIR is presented, debated and framed in the public. In addition, an analysis of parental perception and knowledge of Wi-Fi radiation in classrooms, as an emerging social issue, will be conducted by using in-depth interviewing.

**<u>New Policies and Legislations Regarding EMF Exposure</u>**

- **Measurements in incubators and heating packages** - at the request of the Ministry of Health, the Ministry of Environmental Protection prepared guidelines for such measurements. Accordingly, measurements were taken in several hospitals and their results reflect the average level of exposure of an infant during all his/her incubator care. The results, in 12 types of incubators, range from less than 0.05 μ T to 5 μ T. The recommendation of the Ministry of Environmental Protection was to reduce the duration of exposure as much as possible and give priority to incubators emitting low levels of magnetic field. It was found that there are efficient shielding methods, approved by the manufacturer, for mitigation of the exposure in incubators. In accordance with this, further Clarification is needed.
- **Radiation monitoring system from broadcasting facilities** - For the past 2 years the Ministry of Environmental Protection operates a radiation monitoring system. The system consists of 17 permanent monitoring stations deployed throughout the country. The monitoring stations were deployed near cellular broadcasting stations, radio and television broadcasting stations, and some were also deployed in areas far away from broadcasting facilities (above 300m from base stations and above 5km from radio and television broadcasting stations). This information is distributed on the Ministry of Environmental Protection website. In 2017, the monitoring system indicated that the levels did not exceed the recommended thresholds for exposure to radiation. An analysis of the data from the monitoring system shows that exposure to radiation in 2017 increased by about 10% compared to 2016.
- **Exposure levels to ELF** - The NIR law (2006) states that the Ministry of Environmental Protection should set regulations regarding exposures to RF and ELF (after consulting the Ministry of Health and receiving the approval of the Infrastructure, Telecommunications and Finance ministries). To date, exposure levels have not yet been set. The main barriers for implementing the regulations are the high cost evaluations (claimed by the Ministries of Infrastructure and Finance). In a petition submitted to the High Court of Justice in 2015, the Ministry of Environmental Protection is required to set regulations regarding exposures to ELF. Due to

disagreements among the parties involved regarding the draft regulations, this issue is still being discussed in court.

- **An international survey to examine "E-learning" programs policy in schools** - As part of the Ministry of Education's efforts to strike a balance between protecting children's health and using advanced technologies, the TNUDA Center, as a professional national information center for non-ionizing radiation, assists and advises the ministry. Accordingly, the TNUDA center conducted a survey to examine whether there is a national policy for "E-learning" programs in various countries, and whether there is any reference to the possible health effects of implementing the programs. The survey indicates that while various organizations express a certain concern regarding the possible health effects of using end-users devices emitting NIR for educational purposes, there is – in general - lack of national policy on this topic. In practice, most countries choose to leave the responsibility of implementing "E-learning" programs to the school level.
  In Israel, unlike many countries, there is an attempt to consider the health aspect with the cooperation of the ministries of Education, Health and Environmental Protection and to implement guidelines, accordingly.

**Areas of Public Concern and National Responses**

- The implementation of a program to change the mechanical water monitors with wireless smart meter monitors are still raises some public concern. The Ministries of Health and Environmental Protection advise to use, where possible, wired internet and smart meter monitors connections and to present the consumers with information as to the pros and cons for the chosen technology.

**New Public Information Activities**

**Activities of Israeli National Information Center for Non-Ionizing Radiation, TNUDA**

- **Expanding the research field of the TNUDA information Center –** As usage and variety of communication technologies is constantly in rise as well as their spread to public places, the TNUDA center came to the understanding that health effects, other than exposure to NIR, should be assessed. Therefore, it has been decided to expend research fields and to include health effects related to technology *usage* (such as addiction to cellphones, sleep disturbance and traffic accidents due to use of cellphones while driving).
  - In accordance, a review was conducted *to examine the association between use of digital media and sleep disturbances in children & adolescents.* Good quality, continuous and sufficient sleep is important for physiological and cognitive health. Sleep disturbances are a common phenomenon amongst children and adolescents. One of the possible risk factors associated with sleep disturbances (mainly sleep duration and quality) is the use of digital media (television, computer, cell phone, etc.). The investigation of this association became more relevant due to the growing use of digital media and the increasing number of these devices in children's bedrooms.
    Studies have shown a significant association between digital media use around "bed time" and at night & sleep disturbances (mainly impairment of sleep quality and daytime tiredness). Several mechanisms were suggested to explain this association, such as exposure to contents arousing an emotional reaction, postponement of sleep onset and exposure to blue light or NIR emitted from digital devices. Only few studies have examined the association between digital media use *during the day* and sleep disturbances and their findings are not uniform.
    Following this review, the TNUDA Center has formulated recommendations *aiming to increase awareness amongst children & adolescents, teachers, parents and policy makers.* These recommendations present possible ways to reduce night time use. The recommendations and the full report will soon be published on TNUDA website: www.tnuda.org.il/en