# NATIONAL ASSEMBLY

**FOR WRITTEN REPLY**

**QUESTION NO. 1101**

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**(INTERNAL QUESTION PAPER NO. 19)**

**Ms H Ismail (DA) to ask the Minister of Health:**

Whether any medical studies have been conducted on the effects of 5G radiation; if not, why not; if so, what (a) studies have been conducted and (b) are the effects thereof?

###### NW1397E

**REPLY:**

1. Yes, several studies have been done internationally on the effects of 5G radiation and published in accredited scientific journals. Some of these studies are:

1. Towards 5G communication systems: Are there health implications? *International Journal of Hygiene and Environmental Health* (2018);
2. 5G Radiation and COVID-19: The Non-Existent Connection. International Journal of Research in Electronics and Computer Engineering (2020);
3. 5G Wireless Communication and Health Effects—A Pragmatic Review Based on Available Studies Regarding 6 to 100 GHz. *International Journal of Environmental Research and Public Health* (2019);
4. 5G wireless telecommunications expansion: Public health and environmental implications. *Environmental Research* (2018);
5. Adverse health effects of 5G mobile networking technology under real-life conditions. *Toxicology Letters* (2020);

The World Health Organisation (WHO): 5G mobile networks and health (February 2020) acknowledges two international bodies that have produced electromagnetic fields exposure guidelines that countries need adhere to: a) The International Commission on Non-Ionizing Radiation Protection (2020) guidelines for limiting exposure to Electromagnetic Fields; and b) The Institute of Electrical and Electronics Engineers, through the International Committee on Electromagnetic Safety has produced guidelines for radiofrequencies up to 300 GHz, including the frequencies under discussion for 5G.

1. According to the International Commission on Non‐Ionizing Radiation Protection 2020 Guidelines, 5G is safe. These Guidelines are the revision of the 1998 Guidelines and provide protection for humans from exposure to Electro-Magnetic fields from 100 Kilo Hertz to 300 Giga Hertz. The only substantiated adverse health effects caused by exposure to radiofrequency Electro-magnetic Fields are nerve stimulation, changes in the permeability of cell membranes, and effects due to temperature elevation. Kostoff et al (2020), and Russell (2018) have argued that radiofrequency radiation (RF) used in 5G is increasingly being recognized as a new form of environmental pollution, and adverse systemic health effects beyond skin and eyes.

The WHO (2020) conclusion on 5G mobile networks and health was that no adverse health effect has been causally linked with exposure to wireless technologies. Health-related conclusions were drawn from studies performed across the entire radio spectrum but, so far, only a few studies have been carried out at the frequencies to be used by 5G. Tissue heating was identified as the main mechanism of interaction between radiofrequency fields and the human body. Radiofrequency exposure levels from current technologies resulted in negligible temperature rise in the human body. As the frequency increases, there is less penetration into the body tissues and absorption of the energy becomes more confined to the surface of the body (skin and eye). Provided that the overall exposure remains below international guidelines, no consequences for public health are anticipated.

END.

**Annexure: Reply to Question No. 1101 References**

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| **Reference** | **Abstract** | **Findings** |
| 1. Di Ciaula, A. (2018). Towards 5G communication systems: Are there health implications? International journal of hygiene and environmental health, 221(3), 367-375.
 | Preliminary observations showed that MMW increase skin temperature, alter gene expression, promote cellular proliferation and synthesis of proteins linked with oxidative stress, inflammatory and metabolic processes, could generate ocular damages, affect neuro-muscular dynamics. Further studies are needed to better and independently explore the health effects of RF-EMF in general and of MMW in particular. However, available findings seem sufficient to demonstrate the existence of biomedical effects, to invoke the precautionary principle, to define exposed subjects as potentially vulnerable and to revise existing limits.  | * RF-EMF exposure is rising and health effects of are still under investigation.
* Both oncologic and non-cancerous chronic effects have been suggested.
* 5G networks could have health effects and will use MMW, still scarcely explored.
* Adequate knowledge of RF-EMF biological effects is also needed in clinical practice.
* Underrating the problem could lead to a further rise in non-communicable diseases.
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| 1. Uthman, M., Shaibu, F. E., Bara’u Gafai Najashi, I. F., Labran, A. S., & Umar, U. S. A. (2020) 5G Radiation and COVID-19: The Non-Existent Connection. International Journal of Research in Electronics and Computer Engineering, Vol. 8 Issue 2 Apr.-June 2020
 | This paper presents an overview of the 5G mobile technology alongside an overview of coronavirus diseases and demonstrate that there is no connection between them by providing the scientific evidence of research carried out by international organizations in charge of 5G technology.  | From all the discussions it has been established that coronaviruses are not new disease pathogens but there have been various outbreaks of the disease over the years with various strains. The latest of which is COVID-19. 5G technology is still in development and has not been fully deployed around the world yet. As such, there is no correlation between COVID-19 and 5G technology. COVID-19 originate from animals (bats) and are transmitted to humans and subsequently spread from human to human, certainly not through 5G radiation. |
| 1. Simkó, M., & Mattsson, M. O. (2019). 5G Wireless Communication and Health Effects—A Pragmatic Review Based on Available Studies Regarding 6 to 100 GHz. International journal of environmental research and public health, 16(18), 3406.
 | This review analyzed 94 relevant publications performing in vivo or in vitro investigations. Each study was characterized for: study type (in vivo, in vitro), biological material (species, cell type, etc.), biological endpoint, exposure (frequency, exposure duration, power density), results, and certain quality criteria.  | In order to evaluate and summarize the 6–100 GHz data in this review, it draws the following conclusions:Regarding the health effects of MMW in the 6–100 GHz frequency range at power densities not exceeding the exposure guidelines the studies provide no clear evidence, due to contradictory information from the in vivo and in vitro investigations.Regarding the possibility of “non-thermal” effects, the available studies provide no clear explanation of any mode of action of observed effects.Regarding the quality of the presented studies, too few studies fulfil the minimal quality criteria to allow any further conclusions. |
| 1. The International Commission on Non‐Ionizing Radiation Protection (ICNIRP) Guidelines (2020)
 | The Germany-based scientific body that assesses the health risks of radio broadcasts, called for new guidelines for millimetre-wave 5G, the most high-frequency version of the telecommunications standard. | 5G is safe, according to the international body in charge of setting limits on exposure to radiation. |
| 1. Russell, C. L. (2018). 5G wireless telecommunications expansion: Public health and environmental implications. Environmental research, 165, 484-495.
 | This article will reviews relevant electromagnetic frequencies, exposure standards and current scientific literature on the health implications of 2G, 3G, 4G exposure, including some of the available literature on 5G frequencies.  | 5G technologies are far less studied for human or environmental effects. It is argued that the addition of this added high frequency 5G radiation to an already complex mix of lower frequencies, will contribute to a negative public health outcome both from both physical and mental health perspectives. Radiofrequency radiation (RF) is increasingly being recognized as a new form of environmental pollution. Like other common toxic exposures, the effects of radiofrequency electromagnetic radiation (RF EMR) will be problematic if not impossible to sort out epidemiologically as there no longer remains an unexposed control group. |
| 1. International Commission on Non-Ionizing Radiation Protection. (2020). Guidelines for limiting exposure to Electromagnetic Fields (100 kHz to 300 GHz). Health Physics, 118(5), 483-524.
 | This document presents the revised guidelines, which provide protection forhumans from exposure to EMFs from 100 kHz to 300 GHz. | The only substantiated adverse health effects caused by exposure to radiofrequency EMFs are nerve stimulation, changes in the permeability of cell membranes, and effects due to temperature elevation. There is no evidence of adverse health effects at exposure levels below the restriction levels in the ICNIRP (1998) guidelines and no evidence of an interaction mechanism that would predict that adverse health effects could occur due to radiofrequency EMF exposure below those restriction levels. |
| 1. Kostoff, R. N., Heroux, P., Aschner, M., & Tsatsakis, A. (2020). Adverse health effects of 5G mobile networking technology under real-life conditions. Toxicology Letters, 323, 35-40.
 | This article identifies adverse effects of non-ionizing non-visible radiation (hereafter calledwireless radiation) reported in the premier biomedical literature.  | * Identifies wide-spectrum of adverse health effects of non-ionizing non-visible radiation.
* Most laboratory experiments were not designed to identify the more severe adverse effects reflective of real-life conditions.
* Many experiments do not include the real-life pulsing and modulation of the carrier signal.
* Vast majority of experiments do not account for synergistic adverse effects of other toxic stimuli with wireless radiation.
* 5G mobile networking technology will affect not only the skin and eyes, but will have adverse systemic effects as well.
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| 1. World Health Organisation

(5G mobile networks and health27 February 2020 | Q&A) | Two international bodies produce exposure guidelines on electromagnetic fields. Many countries currently adhere to the guidelines recommended by:The International Commission on Non-Ionizing Radiation Protection and,The Institute of Electrical and Electronics Engineers, through the International Committee on Electromagnetic SafetyThese guidelines are not technology-specific. They cover radiofrequencies up to 300 GHz, including the frequencies under discussion for 5G. | To date, and after much research performed, no adverse health effect has been causally linked with exposure to wireless technologies. Health-related conclusions are drawn from studies performed across the entire radio spectrum but, so far, only a few studies have been carried out at the frequencies to be used by 5G.Tissue heating is the main mechanism of interaction between radiofrequency fields and the human body. Radiofrequency exposure levels from current technologies result in negligible temperature rise in the human body.As the frequency increases, there is less penetration into the body tissues and absorption of the energy becomes more confined to the surface of the body (skin and eye). Provided that the overall exposure remains below international guidelines, no consequences for public health are anticipated. |