



# Radiation Effects on Humans in Daily Life

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## Abstract:

Technology has allowed us to go wireless and avoid the hassle of cables. We can now remotely turn the TVs on, start a coffee machine, and monitor babies using wireless technology. At the same time, we are exposed to unprecedented levels of electromagnetic radiation from wireless signals 24/7. Is devices like mobile, TV wireless devices are safe. They are two controversial statements running till today. One group of experts saying it is safe; another group says effects on human beings a lot. This paper gives clarity how its effects on human beings, based on experimental results and survey.

**Keywords:** Wi-Fi, radiation, effect, human body, x ray, infrared rays etc.

## 1. INTRODUCTION

Now a day's every industry, public environment, mostly every house without Wi-Fi through internet not an efficient in the daily working environment, to that extent public habituated towards it. Just imagine internet became a part of our life. But no one bother about how many effects on our health. but time has came to consider the radiation problems due to internet. Now see the sources of radiation in fig1.

### Sources of Radiation

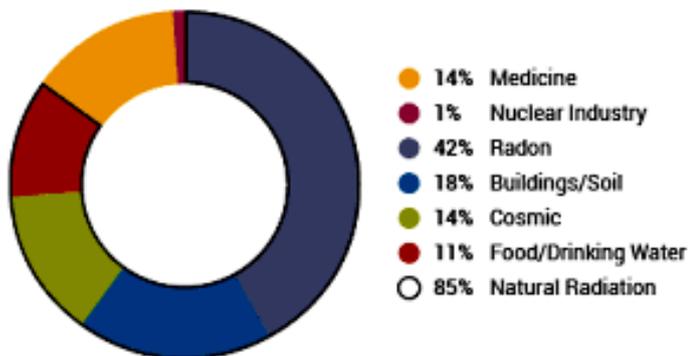


Figure.1. Sources of Radiation

### 1.1 RADIATION EFFECT ON HUMANBEINGS:

Radiation is energy given off by matter in the form of rays or high-speed particles. All matter is composed of atoms. Atoms are made up of various parts; the nucleus contains minute particles called protons and neutrons, and the atom's outer shell contains other particles called electrons.

The nucleus carries a positive electrical charge, while the electrons carry a negative electrical charge. These forces within the atom work toward a strong, stable balance by getting rid of excess atomic energy (Radioactivity). In that process, unstable nuclei may emit a quantity of energy, and this Spontaneous Emission is what we call radiation. Various forms of radiations shown in fig2 which are. Physical Fission, Ionizing, Alpha Particles, Beta Particles, Gamma Rays and X-Rays, Neutrons,

Type of radiation	Source	Range in tissue
Alpha	$^{210}\text{Po}$ 5.3 MeV	Range 0.037mm
Beta	$^{14}\text{C}$ 0.154 MeV maximum energy	Maximum range 0.29mm (typically less)
Beta	$^{32}\text{P}$ 1.71 MeV maximum energy	Maximum range 8mm (typically less)
Gamma	$^{125}\text{I}$ 0.035 MeV	Average distance to collision 33mm
Gamma	$^{60}\text{Co}$ 1.33 MeV	Average distance to collision 164mm

Figure.2. Various Sources and Its Ranges of Radiation

**1.1.a) Physical Forms of Radiation:** Matter gives off energy (radiation) in two basic physical forms. One form of radiation is pure energy with no weight. This form of radiation is known as electromagnetic radiation is like vibrating or pulsating rays or "waves" of electrical and magnetic energy. Familiar types of electromagnetic radiation include sunlight (cosmic radiation), x-rays, radar, and radio waves. The other form of radiation is known as particle radiation is tiny fast-moving particles that have both energy and mass (weight). This less-familiar form of radiation includes alpha particles, beta particles, and neutrons, as explained below.

**b) Radioactive Decay:** As previously indicated, large unstable atoms become more stable by emitting radiation to get rid of excess atomic energy (radioactivity). This radiation can be emitted in the form of positively charged alpha particles, negatively charged beta particles, gamma rays, or x-rays, as explained below. Through this process are called radioactive decay radioisotopes losing their radioactivity over time. This gradual loss of radioactivity is measured in half-lives. Essentially, a half-life of a radioactive material is the time it takes one-half of the atoms of a radioisotope to decay by emitting radiation. This time can range from fractions of a second (for radon-220) to millions of years (for thorium-232). When radioisotopes are used in medicine or industry, it is vital to know how rapidly they lose their radioactivity, in order to know the precise amount of radioisotope that is available for the medical procedure or industrial use.

**c) Nuclear Fission:** In some elements, the nucleus can split as a result of absorbing an additional neutron, through a process called nuclear fission. Such elements are called fissile materials. One particularly notable fissile material is uranium-235. This is the isotope that is used as fuel in commercial plants. When a nucleus fissions, it causes three important events that result in the release of energy. Specifically, these events are the release of radiation, release of neutrons (usually two or three), and formation of two new nuclei (fission products).

**d) Ionizing Radiation:** Radiation can be either ionizing or non-ionizing, depending on how it affects matter. Non-ionizing radiation includes visible light, heat, radar, microwaves, and radio waves. This type of radiation deposits energy in the materials through which it passes, but it does not have sufficient energy to break molecular bonds or remove electrons from atoms. By contrast, ionizing radiation (such as x-rays and cosmic rays) is more energetic than non-ionizing radiation. Consequently, when ionizing radiation passes through material, it deposits enough energy to break molecular bonds and displace (or remove) electrons from atoms. This electron displacement creates two electrically charged particles (ions), which may cause changes in living cells of plants, animals, and people. Ionizing radiation has a number of beneficial uses. For example, we use ionizing radiation in smoke detectors and to treat cancer or sterilize medical equipment. Nonetheless, ionizing radiation is potentially harmful if not used correctly. Consequently, the U.S. Nuclear Regulatory Commission (NRC) strictly regulates commercial and institutional uses of nuclear materials, including the following five major types of ionizing radiation: Alpha, Particles Gamma, Neutrons.

**e) Alpha Particles:** Alpha are charged particles, which are emitted from naturally occurring materials (such as uranium, thorium, and radium) and man-made elements (such as plutonium and americium). These alpha emitters are primarily used (in very small amounts) in items such as smoke detectors. In general, alpha particles have a very limited ability to penetrate other materials. In other words, these particles of ionizing radiation can be blocked by a sheet of paper, skin, or even a few inches of air. Nonetheless, materials that emit alpha particles are potentially dangerous if they are inhaled or swallowed, but external exposure generally does not pose a danger.

**f) Beta Particles:** Beta, which is similar to electrons, are emitted from naturally occurring materials (such as strontium-90). Such beta emitters are used in medical applications, such as treating eye disease. In general, beta particles are lighter than alpha particles, and they generally have a greater ability to penetrate other materials. As a result, these particles can travel a few feet in the air, and can penetrate skin. Nonetheless, a thin sheet of metal or plastic or a block of wood can stop beta particles.

**g) Gamma Rays and X-Rays:** Gamma rays and x-rays consist of high-energy waves that can travel great distances at the speed of light and generally have a great ability to penetrate other materials. For that reason, gamma rays (such as from cobalt-60) are often used in medical applications to treat cancer and sterilize medical instruments. Similarly, x-rays are typically used to provide static images of body parts (such as teeth and bones), and are also used in industry to find defects in welds.

Despite their ability to penetrate other materials, in general, neither gamma rays nor x-rays have the ability to make anything radioactive. Several feet of concrete or a few inches of dense material (such as lead) are able to block these types of radiation.

**h) Neutrons:** Neutrons are high-speed nuclear particles that have an exceptional ability to penetrate other materials. Of the five types of ionizing radiation discussed here, neutrons are the only one that can make objects radioactive. This process, called neutron activation, produces many of the radioactive sources that are used in medical, academic, and industrial applications (including oil exploration). Because of their exceptional ability to penetrate other materials, neutrons can travel great distances in air and require very thick hydrogen-containing materials (such as concrete or water) to block them. Fortunately, however, neutron radiation primarily occurs inside a nuclear reactor, where many feet of water provide effective shielding.

**I.2 The Harmful Side Effects of X-rays Often Pose a Greater Risk than the Original Health Problem:** One of the riskiest of all diagnostic tools is the X-ray machine. Most people who visit a doctor will experience at least one exposure to these high-frequency waves of ionizing radiation (X-rays). These are the facts that have been discovered *so far* about the adverse side effects of X-rays: If children are exposed to X-rays while still in the mother's womb (in utero), their risk of all cancers increases by 40 percent, of tumours of the nervous system by 50 percent, and of leukemias by 70%. Today there are thousands of people with damaged thyroid glands, many of them with cancer, who were radiated with X-rays on the head, neck, shoulder or upper chest 20-30 years ago.

**II.2.1 x ray effects on humans:** 10 X-ray exposures at the dentist's office are sufficient to produce cancer of the thyroid. Multiple X-rays have been linked with multiple myeloma – a form of bone marrow cancer. Scientists have told the American Congress that X-radiation of the lower abdominal region puts a person at risk for developing genetic damage that can be passed on to the next generation. They also linked the 'typical diseases of aging, such as diabetes, high blood pressure, coronary heart disease, strokes and cataracts, with previous exposure to X-rays. It is estimated that at least 4,000 Americans die each year from X-ray related illnesses. In the UK, one fifth to one half of all X-rays given to patients are without real necessity. In the US, the FDA reports that as much as one third of all radiation is unnecessary. In the UK, X-rays ordered by doctors account for over 90 percent of the total radiation exposure of the population (Cambridge University Press, 1993). In Canada, almost everyone gets an annual X-ray of one sort or another. Old X-ray equipment still used in many hospitals gives off 20 to 30 times as high a dose of radiation as is necessary for diagnostic purposes. Contrasting media reports abound regarding the dangers occurring at the Fukushima nuclear facility in Japan. The reports have triggered uncertainty, concern and even panic among members of the general public in Japan and around the world. Workers in Japan have been bravely battling to save the facility from a disastrous meltdown, exposing their bodies to potentially dangerous and lethal doses of radiation. In this text, we attempt to explain what impact radiation may have on the human body. Radiation takes place when the atomic nucleus of an unstable atom decays and starts releasing ionizing particles, known as ionizing radiation. When these particles come into contact with organic material, such as human tissue, they will damage them

if levels are high enough, causing burns and cancer. Ionizing radiation can be fatal for humans. REM (roentgen equivalent in man); this is a unit we use to measure radiation dosage. We use this measurement to determine what levels of radiation are safe or dangerous for human tissue. It is the product of the absorbed dose in rads and a weighting factor ( $W_R$ ), which accounts for how effective the radiation is in causing biological damage. A sudden, short dose of up to 50 rem will probably cause no problems, except for some blood changes. From 50 to 200 rem there may be illness, but fatalities are highly unlikely. A dose of between 200 and 1,000 will most likely cause serious illness - the nearer the 1,000 it is, the poorer the outlook for the human will be. Any dose over 1,000 will typically cause death. When an atomic bomb explodes, as in Hiroshima and Nagasaki during WWII, people receive two doses of radiation: one during the explosion, and another from fallout. Fallout refers to the radioactive particles that float in the air after an explosion; they rise and then gradually descend to the ground. A dose of 100 rems will have probably cause some initial signs of radiation sickness, such as loss of white blood cells, nausea, vomiting, and headache. With a 300 rem dose you may lose hair temporarily - your nerve cells and those that line the digestive tract will be damaged. As the dose rises and more white blood cells are lost, the human's immune system becomes seriously weakened - their ability to fight off infections is considerably reduced. Exposure to radiation makes our bodies produce fewer blood clotting agents, called blood platelets, increasing our risk of internal bleeding. Any cut on the skin will take much longer to stop bleeding. Experts say that approximately 50% of humans exposed to 450 rems will die, and 800 rems will kill virtually anyone. Death is inevitable and will occur from between two days to a couple of weeks.

**II.2.2 Millisieverts per hour (mSv):** this is a measure used more commonly by the International Commission on Radiological Protection. For example: A gastrointestinal series X-ray investigation exposes the human to 14 mSv Recommended limit for volunteers averting a major nuclear escalation - 500 mSv (according to the International commission on Radiological Protection). Recommended limit for volunteers rescuing lives or preventing serious injuries - 1000 mSv (according to the International commission on Radiological Protection). Below is a list of signs and symptoms likely to occur when a human is exposed to acute radiation (within one day), in mSv: 0 to 250 mSv - no damage, 250 to 1,000 mSv. Some individuals may lose their appetites, experience nausea, and have some damage to the spleen, bone marrow and lymph nodes. 1000 to 3000 mSv - nausea is mild to severe, no appetite, considerably higher susceptibility to infections. Injury to the following will be more severe - spleen, lymph node and bone marrow. The patient will most likely recover, but this is not guaranteed. 3,000 to 6,000 mSv - nausea much more severe, loss of appetite, serious risk of infections, diarrhea, skin peels, sterility. If left untreated the person will die. There will also be haemorrhaging. 6,000 to 10,000 mSv - Same symptoms as above. Central nervous system becomes severely damaged. The person is not expected to survive.

## II. LITERATURE SURVEY

There is lot of surveys theoretically, experimentally continuing their activities by the experts to till now. But experts still confusing. The following are some survey reports listed below.

**III.1 Recent Studies of Wi-Fi Biologic Effects:** i) Effects of prenatal exposure to WIFI signal (2.45 GHz) on postnatal development and behavior in rat: Influence of maternal restraint. Behavioural Brain Research is the Effects of gestational exposure to WiFi signal and restraint along gestation period on the offspring were studied says us is the pups were evaluated for physical development and neuro motor maturation. Gestational Wi-Fi exposure and restraint, adversely affected offspring neurodevelopment and behaviour at adulthood. Progeny brain oxidative balance and serum biochemistry were disrupted. ii) rats in Wi-Fi exposure groups could not discriminate significantly between the novel and familiar objects in any of the standard SOR, tactile SOR, visual SOR, and CMOR tests. The expression of M1 receptors increased following Wi-Fi exposure. In conclusion, results of this study showed that chronic exposure to Wi-Fi electromagnetic waves might impair both uni modal and cross-modal encoding of information. iii) the Effect of Radiofrequency Radiation Emitted From Wi-Fi Router and Mobile Phone Simulator on the Antibacterial Susceptibility of Pathogenic Bacteria *Listeria monocytogenes* and *Escherichia coli* says assessed if the exposure to 900 MHz GSM mobile phone radiation and 2.4 GHz radiofrequency radiation emitted from common Wi-Fi routers alters the susceptibility of microorganisms to different antibiotics. The pure cultures of *Listeria monocytogenes* and *Escherichia coli* were exposed to RF-EMFs generated either by a GSM 900 MHz mobile phone simulator and a common 2.4 GHz Wi-Fi router. iv) and Excerpts says: Bacteria are becoming resistant to almost all commonly available antibiotics and this is a worldwide problem *Listeria monocytogenes* was recognized as the main cause of neonatal infection, meningitis, and sepsis. *Listeria* infection in adult patients is related to immune compromised systems like HIV infection, organ transplants, individuals who have received corticosteroids, and immunosuppressant drugs for their malignancies. *Escherichia coli* known as *E coli* is a common cause of life-threatening infections such as bloodstream and urinary tract infections. In the current study, the pattern of the response of *E coli* to Wi-Fi and RF simulator radiation was identical. The maximum differences in the diameters of inhibition zones were observed between 6 and 9 hours of the bacterial exposure to radiation (Figures 1 and 2). After 12 hours of exposure, the bacterial responses to radiation as a stressor led to returning to the preexposure status. our data confirm previous studies that showed that radiofrequency radiation could induce changes in cell growth and antibiotic sensitivity in *E coli*. Based on our results, it can be concluded that the bacterial strains used in this study respond differently to EMFs. These bacteria were capable of responding to environmental stresses that act by activating some specific systems such as ion channels, change via the membrane, DNA repair system, and probably ion efflux pumps in the membrane as well as interactions of molecules and antibacterial agents. The current study measured typical and peak RF levels from Wi-Fi and other sources in 23 schools in Australia. All of the RF measurements were much lower than the reference levels recommended by international guidelines for protection against established health effects.

The typical and peak RF levels from Wi-Fi in locations occupied by children in the classroom were of the order of 10-4 and 10-2% of the exposure guidelines, respectively. Typical RF levels in the classroom were similar between Wi-Fi and radio but higher than other sources. In the schoolyard typical RF levels were higher for radio, TV and mobile phone base stations compared to Wi-Fi. The results of this study showed

that the typical RF exposure of children from Wi-Fi at school is very low and comparable or lower to other sources in the environment. Excerpts words: Wi-Fi transmissions consist of sequences of RF burst signals or pulses ranging in duration depending on the amount of data being carried by a pulse(15). The proportion of time that Wi-Fi transmits RF signals is called the duty cycle. Joseph et al.(14) in measuring Wi-Fi in 176 different urban locations (outdoors, homes, offices) found a median duty cycle of 1.4% over all the measurements. Particularly in schools, Khalid et al.(10) in measuring Wi-Fi in six schools found a mean duty cycle from the access points of 4.8%. In our study duty cycle was measured separately for the 2.45 and 5 GHz transmissions when performing the stationary Wi-Fi measurements in the centre of the classroom. The median duty cycle for 23 schools that were measured in the current study was 6.3 and 2.4% for 2.45 and 5 GHz transmissions, respectively.

Members of the public often ask about the cumulative exposure that a child receives when using a Wi-Fi device in a classroom in which a number of children are simultaneously using Wi-Fi. When downloading files, most of the transmissions will be from the access point, not the students' device. When downloading and uploading only a portion of the maximum capacity of a network would be used even in a classroom filled with children using Wi-Fi. The Wi-Fi network divides RF transmissions among the access points and client devices therefore the individual RF exposure to a child in a classroom that is using a device consists of sequential exposures from all active devices, the majority of which are located at some distance away(15). For the majority of schools (20) the measurements in the current study were conducted in an empty classroom (to avoid lesson disruption) with an access point and one laptop. In three schools, measurements were conducted with students or teachers present and using Wi-Fi devices. A comparison between measurements conducted in empty classrooms and classrooms with multiple students/teachers using Wi-Fi showed no significant difference in the RF levels ( $p > 0.1$  for all); although this may have been due to low numbers (only three schools measured with multiple users in the classroom).viii) Data obtained from the One day test showed an increase in concentration of blood glucose, decrease in Triglyceride level and GGT factor ( $P < 0.05$ ), however no observed significant difference on the Cholesterol, HDL, LDL level and hepatic enzymes activities in compare to control group for mobile users. Groups of the five-day test showed reduction in the amount of blood glucose, elevation of cholesterol level and LDL relative to control group ( $P < 0.05$ ).it concludes WiFi exposure may exert alternations on the metabolic parameters and hepatic enzymes activities through stress oxidative and increasing of free radicals, but the use of vitamin C protects them from changing induced. Also taking optimum dose of vitamin C is essential for radio protective effect and maintaining optimum health.ix) Hलगामुने MN. Review:

Weak radiofrequency radiation exposure from mobile phone radiation on plants says The aim of this article was to explore the hypothesis that non-thermal, weak, radiofrequency electromagnetic fields (RF- Oxidative stress of brain and liver is increased by Wi-Fi (2.45GHz) exposure of rats during pregnancy EMF) have an effect on living plants. and the development of newborns. Oxidative stress plays important role in biology of Wi-Fi (2.45 GHz).2.45 GHz increased oxidative stress in brain and liver pregnant rats and their

newborns. Brain seems sensitive to oxidative injury in the development of newborns

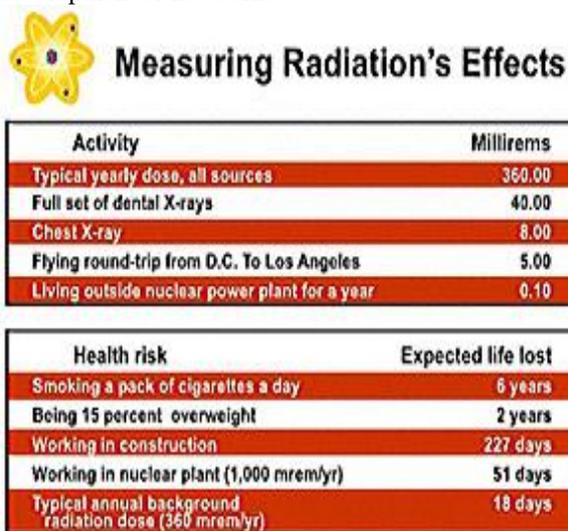


Figure.3. Measuring Radiation Effects

### III. PRAPOSED STUDY

**III.1 Effects on Humans Health:** Wi-Fi is convenient but many have raised doubts concerning the safety of unseen forces that permeate everything around us. Since the introduction of Wi-Fi in 1997, researchers have performed dozens of studies to explore the subject. The results are clear and shocking Wifi can negatively affect overall health and brain health, especially in children. Perhaps most shocking is that this information is not new or even that controversial. In fact, in 2008 the well-renowned publication Scientific American ran a piece explained the danger Wi-Fi has on the human brain. the potential dangers of Wi-Fi with these 10 facts.fig 4 shows radiation sickness of humans.fig4 shows radiation dose.

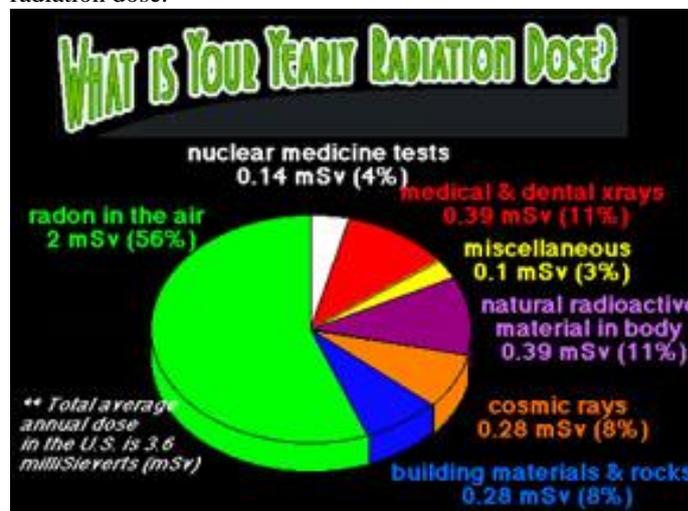


Figure.4. radiation dose.

### III.2. Contributes to the Development of Insomnia

Have you ever felt more awake after using Wi-Fi or even struggled to sleep through the night? Reports of these phenomena have been frequent and even prompted a study in 2007 that evaluated low-frequency modulation from cell phones and its impact on sleep. Participants were exposed to the electromagnetic signals from real phones or no signal from fake phones. Those exposed to the electromagnetic radiation had a significantly more difficult time falling asleep and changes in brainwave patterns were observed. It's been

suggested that sleeping near a phone, in a home with Wi-Fi, or in an apartment building with many Wi-Fi signals can create chronic sleep problems as the constant bombardment of Wi-Fi pollution interferes with falling asleep and sleep patterns. For many, sleep deprivation is just the start for larger problems. The development of depression and hypertension has also been linked to inadequate sleep. fig5 shows sickness due to radiation

**III.3. Damaging to Childhood Development:** Exposure to non-thermal radio frequency radiation from Wi-Fi and cellular phones can disrupt normal cellular development, especially fetal development. A 2004 animal study linked exposure to delayed kidney development. these findings were supported by a 2009 Austrian study. In fact, the disruption of protein synthesis is so severe that authors specifically noted, “this cell property is especially pronounced in growing tissues, that is, in children and youth. Consequently, these population groups would be more susceptible. Have you ever felt more awake after using Wi-Fi or even struggled to sleep through evaluated low-frequency modulation from cell phones and its impact on sleep. Participants were the night? Reports of these phenomena have been frequent and even prompted a study in 2007 that exposed to the electromagnetic signals from real phones or no signal from fake phones. Those exposed to the electromagnetic radiation had a significantly more difficult time falling asleep and changes in brainwave patterns were observed. Than average to the described effects.” In short, bathing the developmentally young in Wi-Fi increases their risk of developmental issues.

**III.4. Affects Cell Growth:** When a group of Danish ninth graders experienced difficulty concentrating after sleeping with their cell phones by their head, they performed an experiment to test the effect of wireless Wi-Fi routers on garden cress. One set of plants was grown in a room free of wireless radiation; the other group grew next to two routers that released the same amount of radiation as a cell phone. The results? The plants nearest the radiation didn't grow.

**III.5. Derails Brain Function:** Just as the Danish high scholars noticed problems with concentration, scientists have begun to look at the impact of 4G radiation on brain function. Using MRI technology, research performed just last year found that persons exposed to 4G radiation had several areas of reduced brain activity.

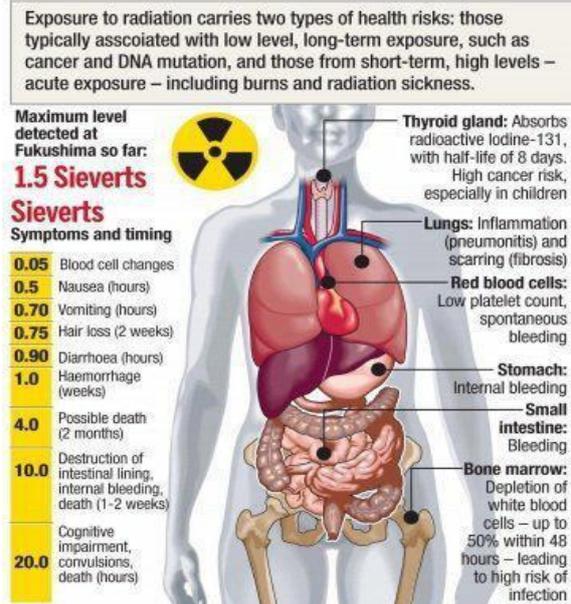
**III.6. Reduces Brain Activity in Females:** A group of 30 healthy volunteers, 15 men and 15 women, were given a simple memory test. First, the entire group was tested without any exposure to Wi-Fi radiation — no problem. Then, they were exposed to 2.4 GHz Wi-Fi from a wireless access point for about 45 minutes. During that portion of the testing, brain activity was measured and the women had a noticeable change in brain activity and energy levels. [8] Sorry ladies! But guys, don't get too comfortable.

**III.7. Neutralizes Sperm:** the heat generated by laptops kills sperm. Well, now it turns out that heat isn't the only threat to a man's virility. Research has found exposure to Wi-Fi frequencies reduce sperm movement and cause DNA fragmentation. Both human and animal testing has confirmed that exposure negatively affects sperm.

**III.8. Impact Fertility:** it's not just sperm. The results of an animal study suggest that some wireless frequencies may prevent egg implantation. During the study, mice exposed 2

hours a day for 45 days had significantly increased oxidative stress levels. The cellular damage and impact on DNA structure abnormal pregnancy or failure of the egg to implant.

## RADIATION SICKNESS



**Figure.5. Radiation sickness of human organs**

The Karolinska Institute in Sweden released a warning in 2011, stating “Pregnant women are cautioned to avoid using wireless devices themselves and distance themselves from other users,” “Current US [and Canada]...standards for radio frequency and microwave radiation from wireless technology are entirely inadequate,” and “Safety standards also ignore the developing fetus.

**III.9. Provokes Cardiac Stress:** If you think your heart races when surrounded by wireless networks or 3G or LTE cell phones, it may not be in your head. A study involving 69 subjects reported that many of them experienced a real physical response to electromagnetic frequencies. Exactly what was the physical response? Increased heart rate similar to the heart rate of an individual under stress.

**III.10. Linked to Cancer:** This is extremely controversial but we can't ignore that plenty of animal models indicate that exposure to electromagnetic radiation increases the risk of tumor development. While human studies are rare, reports and case studies abound. One such case involves a young 21-year-old woman who developed breast cancer. What makes this case unique was that her family did not have a predisposition to breast cancer... and she developed the tumor right on the spot she carried her cell phone in her bra.

**I10. You Can Protect Yourself:** Although mainstream outlets may ignore the proven dangers, especially in the US and Canada, researchers have identified several methods that can offer a level of defence. First off, reduced melatonin seems to correspond with exposure. Thus increasing melatonin through supplementation may help offset some of the effects. In animal tests, L-Carnitine provides antioxidant support for nutrients negatively affected by 2.4 GHz radiation. Although melatonin and L-Carnitine offer a nutritional defense, they don't block exposure. And that's very hard to accomplish anyway. Look at coverage maps from cell phone companies, or notice how many Wi-Fi networks your smart phone prompts for you to

join. We're surrounded and bombarded by electromagnetic radiation. Blocking exposure is difficult but there are a few small steps you can take. For one, do not keep cell phones, laptops, and tablets close to your body. And if it's not being used, shut them off (your wireless router too). There are also a number of devices available to counteract electromagnetic frequencies. Check out these ways to protect yourself from laptop radiation and cell phone radiation,

**11. OVERALL Effects of Wi-Fi:** Wi-Fi does not immediately cause diagnosable illness. For this reason, many of us choose to ignore that it can have any affect at all. However, it can interfere with our bodily functions which may eventually progresses into diseases like cancer and neurodegenerative diseases after long term exposure. Because these are complex diseases that develop over decades,

Chest X-ray	0.1 mSv
Average background exposure in one year	3 mSv
Abdominal X-ray	4 mSv
Living on the Colorado Plateau for one year	4.5 mSv
Typical yearly dose for a uranium miner	5-10 mSv
Full-body CT scan	10 mSv
Lowest dose for any statistical risk of cancer	50 mSv
Mild radiation sickness (headache, risk of infection)	0.5-1 Sv
Light radiation poisoning (mild to moderate nausea, fatigue, 10% risk of death after 30 days)	1-2 Sv
Severe radiation poisoning (vomiting, hair loss, permanent sterility, 35% risk of death after 30 days)	2-3 Sv
Severe radiation poisoning (bleeding in mouth and under skin, 50% risk of death after 30 days)	3-4 Sv
Acute radiation poisoning (60% fatality risk after 30 days)	4-6 Sv
Acute radiation poisoning (bone marrow destroyed, nearly 100% fatality after 14 days)	6-10 Sv
Acute radiation poisoning (symptoms appear within 30 minutes, massive diarrhea, internal bleeding, delirium, coma)	10-50 Sv
Coma in seconds or minutes, death within hours	50-80 Sv
Instant death*	>80 Sv

\* Actually, an instant death would be ideal. There have been a couple of recorded cases where people have been exposed to levels over 100 Sv and lived for hours or days.

**Figure.6. Various X Ray Effects On Human**

it is difficult to conclusively show that the increase in wireless signal exposures directly cause the diseases. International Agency for Research on Cancer (IARC) considers wireless radiation as a class 2B possible carcinogen due to limited evidence. This small number of studies are leaning towards showing that electromagnetic radiations, including Wi-Fi, are not safe. In the Lancet article outlining their considerations, that IARC states that epidemiological studies that follow humans who use WiFi and cell phones for a few years are not conclusive. However, rodent studies that follow the animals throughout their lifetime find that wireless radiation does cause cancer or worsen cancer prognosis. The same animal studies also observed other changes in the brain and blood brain barrier in animals that are exposed to the radiation. The limited evidences in humans may be why regulators are claiming that this type of radiation is safe. However, some anecdotal evidences, such as how Canadian families in Ontario are noticing headaches and brain fogs in their children, suggest that Wi-Fi may not be healthy, so it is probably better to err on the side of caution. It is even more important to protect children from radiation as their small and growing bodies are more vulnerable to radiation than adults. Many products on the market aim to help protect babies is from Wi-Fi radiation

(like this belly armour blanket and even this belly-shielding band for pregnant moms).

**How to Reduce Wi-Fi Exposure:** First, it is important to reduce use as much as possible, especially until we know more about the long-term effects of WiFi. The pro-WiFi crowd may scoff at the idea that anything could be potentially harmful about it, but we once thought smoking was perfectly fine too!.While it may not be possible to get the entire family on board, there are many options to reduce exposure while keeping everyone happy, including:

**Turn off Wi-Fi before Going to Bed (Good):** Everyone should be sleeping at bed time, and Wi-Fi signal may interferes with the brain during sleep, so it is a good idea to turn it off before going to bed. This allows the body to rest more deeply. By turning it off at night, you are effectively cutting down exposure by 33%. (Aside from the WiFi reduction, many security experts also recommend turning off your internet when not using it).In addition, because many people browse the internet mindlessly at night, some may also find that having a Wife curfew improves their marriage because they become more present with their spouse. Many router models will have features that make it possible to automatically shut off WiFi connection and turn it back on at the same time every day, which will be useful for this purpose. Turn On Wi-Fi Router Only When in Use (Better)If you and your family members are up for giving up Wi-Fi for the most part, but still insist on connecting some devices from time to time, then having an option to switch on the router when in use is a better option as this reduces Wi-Fi exposure only to a few hours a day. Give Up Wireless and Hardwire All Your Connections (Best) Giving up WiFi altogether is the healthiest option. It may sound daunting but it is possible and may mitigate several health issues down the line. In addition, you will enjoy more consistent and faster internet when directly hardwired in. It is certainly more work and not doable for everyone, but something we are (slowly) attempting. You'll need to pick up some affordable tools, including: Ethernet – if the one you have doesn't have enough ports for every device and everyone to use. They can be plugged into an existing hub that you already have in order to expand the number of ports. Long to allow everyone to connect from anywhere in your home. Ethernet – makes it possible to connect devices that don't have Ethernet ports, including tablets, smart phones, and some computers. It is also a good idea to use wired peripherals like keyboards, mice, and headphones instead of wireless ones to reduce exposures to electromagnetic radiation. If that all seems complicated to set up, I'd recommend asking someone to help. My tech-savvy brother was the lucky recipient of my questions. Hold Up on Adding Gadgets or Upgrading to Smart Homes, Offices, and Cars: With new wireless technology, wireless-enabled devices with bells and whistles are on sale every single day. Smart home thermostats, bluetooth-controlled cookers, wireless baby monitoring system, and smart beds might make life easier, but they may not be as safe as we think. Such technologies are still very new. These devices use many forms of wireless technologies, for which we don't fully understand the long term health consequences. For these, less is more. Turn Devices on Airplane Mode Cell phones and tablets emit electromagnetic frequency when the receivers are turned on. Because we typically use these devices very close to our bodies for extended periods of time, exposure levels can be very high. Therefore, important to keep them on airplane mode, especially when they are around children. Remember to also teach children and caregivers to turn these

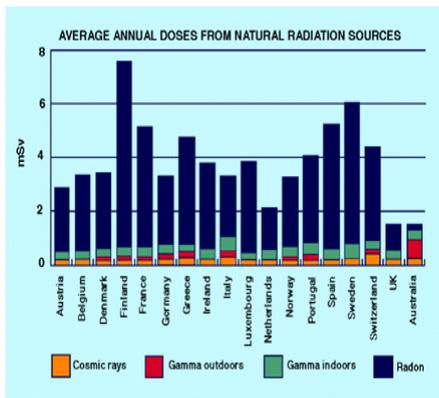
devices on airplane mode to reduce Wi-Fi and electromagnetic exposures. How to Mitigate the Harmful Effects of Wi-Fi Exposure It may be difficult to completely eliminate exposure, especially if you live or work in an urban area. In addition to taking the steps above to reduce Wi-Fi exposures, there are many ways to mitigate the harmful effects of Wi-Fi signals, including: Use a Dirty Electricity Filter to Reduce Electromagnetic Radiation Dirty electricity occurs when electronic devices need to manipulate the electric currents into the format and voltage that the devices need. This can create electrical surges throughout the wiring system. Electronic devices, including Wi-Fi Routers, phone chargers, and computers all produce dirty electricity, which can be a significant source of harmful electromagnetic frequencies (EMF) in the building. In order to mitigate this effect, consider installing dirty electricity filters on outlets throughout the home and work environment. Earthling: Wireless devices emit unhealthy positive ions and also interfere with the waves in our own bodies, such as our brain waves and the electrical system that runs our cells. By earthling, the positive ions in our bodies can be equalized with negative ions from earth, which can mitigate the harmful effects of EMFs. In addition, earthling allows our bodies to synch with the Schumann resonance (7.83 Hz), which is earth's own electromagnetic frequency that we are naturally built to be exposed to. A Japanese study in 2005 showed that the Schumann resonance can reduce blood pressure and produce some positive health outcomes. By synching with earth's natural frequency, we reduce the risks of WiFi waves interfering with our bodily functions. You can earth simply by standing barefoot on the ground for 20 minutes daily. Alternatively, you can also use a grounding shoes with an earthling metal piece, or bed sheets that connect to the grounding port of your home electrical outlets.

**Adding Negative Ions:**

Exposure to Wi-Fi can result in a build-up of positive ions in your body, which can promote inflammation. Therefore, if you are regularly exposed to Wi-Fi, it is even more important to regularly expose yourself to negative ions to neutralize the positive ions. You can find naturally occurring negative ions near moving water, such as at the beach or moving streams of water. In addition, you can use a Himalayan salt lamp or negative ion generator in your home to increase your exposure to healthful negative ions and mitigate the negative effects from Wi-Fi exposure.

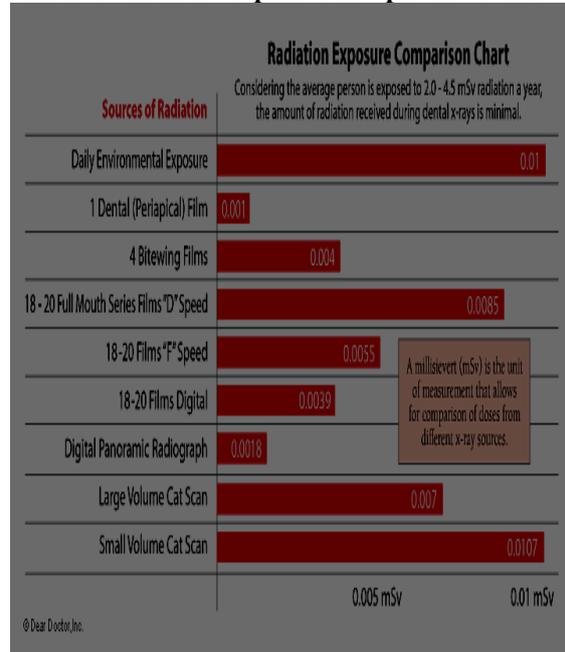
**IV.COMPARISONS & CONCLUSIONS**

Sun rays are most powerful. it has all rays, it gives birth and takes towards death early, due to intensity of light and frequency. Such a strong high frequencies are taking on earth in the form of wifi and radio, TV, for our daily speed life. but the effect we sre not considering. time hacame to consider all.



**Figure.7. average dose for natural source.**

**Table.1. Radiation exposure comparison chats.**



**Table.2. Comparison Various X Rays**

Diagnostic Procedure	Typical Effective Dose (mSv) <sup>1</sup>	Number of Chest X rays (PA film) for Equivalent Effective Dose <sup>2</sup>	Time Period for Equivalent Effective Dose from Natural Background Radiation <sup>3</sup>
Chest x ray (PA film)	0.02	1	2.4 days
Skull x ray	0.1	5	12 days
Lumbar spine	1.5	75	182 days
I.V. urogram	3	150	1.0 year
Upper G.I. exam	6	300	2.0 years
Barium enema	8	400	2.7 years
CT head	2	100	243 days
CT abdomen	8	400	2.7 years

fig 7,8,9 shows The average dose for natural source, radiation exposure comparison & comparison various x rays After observation above diagrams 7, 8, 9 and studied reviews, the effect of radiation is May be less on human beings per day. But the effect is more and to the considerable amount. Radiation effect is much on small living things. and it's more on persons, who are using wifi, TV, Radio, Mobile to the maximum. Technology improving day by day is defiantly helps us many ways, but at the same time radiation effect also considered has to take precautions to reduce the effect to maximum.

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