EMF Dangers and EMF Effects on Health

EMFs (electromagnetic fields) can penetrate buildings and the human body. Today, everyone is exposed to man-made, artificial, EMFs from electrical power lines, radio and TV broadcast towers, cell phones and cell towers, tablets, baby monitors, surveillance devices, Wi-Fi routers, utility meters, and even satellites. These sources bombard us with both low frequency and high frequency radio waves.

Photo by JeepersMedia

We are increasingly concerned about the myriad of EMFs we are exposed to every day. Radio frequency radiation produces biological effects at very low intensity levels. Damage does not require ionizing radiation to break molecular bonds. Significant biological effects occur at exposure levels much lower than current public safety levels.

Epigenetic changes that alter gene activation and expression are of increasing concern. Of particular interest is the effects EMFs have on young people, including the fetus, infant and young child.

Children exposed to electromagnetic radiation exhibit functional changes similar to autism and attention deficit hyperactivity disorder. Adolescents experience problems with memory, learning, attention, concentration, behavior problems and sleep quality.

What is Electromagnetic Radiation?

Electromagnetic fields (EMFs) are caused by the movement of electrons. Even within atoms, electrons moving in a circular fashion create static, non-changing, magnetic fields. This is why certain substances can be magnetized.

But, most man-made EMFs are generated by alternating currents moving in wires or antennas. This creates changing electric and magnetic fields that radiate out at the speed of light. Electromagnetic radiation covers a broad range of frequencies from around 10 Hz (10 oscillations per second) to 300 GHz (300 billion oscillations per second).

Absorption of electromagnetic radiation depends on several factors. These factors include the strength of the radiation, the distance one is from the source or radiation, as well as one's orientation to the radiation. The water and mineral content of your body also plays a role.

Children are more susceptible to damage from radiation than adults. The tissue composition and anatomy of a child differs from that of an adult. A child's head, bone marrow and eyes absorb more energy than those of an adult. And, children's bodies are still developing and are, thus, more sensitive to long term effects.

Typical Man-made Causes of Electromagnetic Fields (EMF)

Man-made electromagnetic fields result from the movement of electrons, electrical currents, in wires and antennas. It is almost impossible to avoid exposure to these fields.

- Electrical wiring and transmission lines
- Radio or television broadcast antennas

- Radar installations
- Satellites
- Medical devices such as magnetic resonance imaging (MRI)
- Household appliances such as microwave ovens
- Cordless telephones
- Cell phones and cell towers
- Television and computer screens
- Wireless local area networks and WiFi
- Smart electric and gas meters

EMF Dangers in Animals

Clinical studies of ENFs are typically done on animals. After all, deliberately exposing humans to EMFs is not exactly ethical.

One study exposed pregnant rats to 2.4 GHz Wi-Fi EMFs showed that the Wi-Fi exposed offspring impaired spatial learning and motor function. The study also found that exercise could help reduce the deficiencies of both cognitive and motor function.

Other mice or rat studies have shown the following effects of cell tower EMF radiation:

- Change in immunological functions
- Decrease in reproductive function (After five generations of exposure the mice were not able to produce offspring.)
- Increases in neurodegenerative diseases
- Increase in serum testosterone levels
- Increase in the permeability of the blood–brain barrier
- Increased DNA damage in cells
- Increase in DNA strand breaks in brain cells
- Decreased DNA repair
- Animals become more sensitive to radiation after long-term exposure

A study of cell tower electromagnetic radiation in India

looked at the effects cell tower electromagnetic radiation had on birds. The researchers found that under the influence of cell tower radiation they became *disoriented* and flew in all directions. Also animals living near the towers had *more still births*, spontaneous *abortions*, birth *deformities*, and experience more *behavioral problems* with a general *decline in overall health.* The authors of the study indicate that because the cell phone industry do not admit any dangers, it is "becoming another cigarette industry."

Symptoms of Electromagnetic Field Dangers to Humans

While we do not experiment on humans in a clinical setting, the environment is causing some humans to be exposed to higher levels of electromagnetic radiation. A number of studies have been done to compare the health of people living near cell phone towers with the health of those living far from cell phone towers. Some scientific findings about people living close to cell towers include:

- Significant increases for all cancers and malignant melanoma in both men and women
- Adult leukemia and lymphoma clusters
- Elevated rates of mental illness
- Higher rates of brain tumors
- Sleep disorders
- Decreased concentration
- Anxiety
- Elevated blood pressure
- Headaches
- Memory impairment
- Increased white cell counts
- Decreased lung function in children
- Motor, memory, and learning impairment in children

In addition to studying the effects of cell phone towers, a

number of studies were conducted when digital TV was introduced. Three German physicians wrote to the President of the United States warning about the results of digital broadcasting in Germany. They indicated once digital broadcasts were begun there was a noticeable increase of headaches, sleep problems, fuzzy thinking, chest tightness, shortness of breath, irritability, nervousness, depression, anxiety, burning skin, and weight gain.

When people moved away from the area into nearby valleys where the radiation did not penetrate they symptoms quickly went away.

Another study showed that children born to mothers who used cell phones have more behavioral problems than children born to mothers who did not use cell phones during pregnancy. Children of cell phone using mothers had 25% more **emotional problems**, 49% more **conduct problems** and 35% more **hyperactivity**.

Eight out of ten epidemiological studies indicate that living within 500 meters (nearly a third of a mile) of a cell tower increased risks of neurobehavorial symptoms or cancer.

Wireless wake-up call | Jeromy Johnson | TEDxBerkeley

A Silicon-valley engineer turned technology health advocate, Jeromy Johnson discusses our attachment to technology and the health hazards such an addiction may hold.

Legal Remedies Regarding Utility Transmission Lines

A number of lawsuits have been brought to halt construction of transmission lines (as well as cell towers) or to seek

monetary damages for loss of property value when utility transmission lines and their effect are placed close to an owner’s property.

Transmission lines are high voltage lines (often from 230kV to 12kV) from the generating plants to local neighborhoods where the voltage is stepped down and delivered to homes.

The basic legal theories used in most lawsuits regarding transmission line include:

- **Trespass**: The idea is that electromagnetic fields constitute an “intrusion that invades the possessor’s protected interest.”
- **Nuisance**: The claim is that there is unreasonable and substantial interference caused by the EMFs that could cause more than trivial harm. This could be either a public or private nuisance.
- **Strict Liability**: This requires that electricity transmission lines be considered a defective product that causes harm or presents a high degree of risk.
- **Personal Injury**: Here a legal causation must be established.
- **Damages**: The claim here is that transmission lines cause emotional distress from fear of cancer or other injuries, on an increased risk of harm.

While some people have won cases against utility companies, most people struggle in legal battles. The utilities have nearly unlimited resources to defend themselves and the scientific evidence for harm is not readily demonstrable.

It will take time for the scientific community to isolate high voltage EMFs as the source of injury on humans.

Conclusions You Can Use

The evidence is accumulating that exposure to electromagnetic

radiation does cause harm to human beings. This exposure is, unfortunately, increasing as more wireless devices proliferate in our society.

While most people cannot eliminate such exposure from their lives, many people can take steps to limit such exposure. Some steps you can take to reduce exposure include:

- Turn off wireless devices (cell phones, routers, ect.) during sleeping hours
- If you have a “landline” phone, forward your cell phone to your landline while you are home and turn off your cell phone.
- Children and pregnant women should avoid using cell phones
- Use “old-fashioned” flip-phones that emit less electromagnetic radiation than smart phones
- Carry cell phones in a purse of backpack as far from your body as possible
- Use tablets in “airplane mode” whenever possible and shut them off when not in use
- Use cell and mobile phones in “speaker” mode to avoid close contact with the phone’s radiation
- Connect your computer to your modem with an Ethernet cable and turn off Wi-Fi
- When looking for a new home, try to be at least a third of a mile from the nearest cell tower, broadcast antenna or high tension transmission lines
- Check at school to try to reduce wireless devices in an around the classroom

In short, try to limit your exposure to artificial, man-made electromagnetic radiation.

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Hydrogenated Water Helps Reduce Oxidative Stress

Hydrogenated water helps reduce the oxidative stress that accelerates aging. If you are interested in slowing aging, reducing inflammation, and protecting yourself from many diseases and medical conditions, hydrogen water may be the key to your success.

Free radicals and other reactive oxygen species (ROS) are the result of normal enzymatic and nonenzymatic reactions in the human body. For example, stress, inflammation and exercise can create free radicals.

Free radicals can also be generated because of external influences such as

- Radiation
- X-rays
- Ozone
- tobacco smoke
- Exposure to ultraviolet rays
- Air pollutants
- Industrial chemicals

Oxidative stress due to excess free radicals progressively damage lipids, proteins, carbohydrates, RNA and DNA. This causes damage to cells and homeostatic disruption. The damage accumulates over time throughout the body.

Free radical damage is important because it manifests itself as disease and sickness. Free radical damage is associated with a number of conditions including premature aging, cancer, hypertension, heart diseases, stroke, arthritis, atherosclerosis, metabolic syndrome and diabetes.

Balance Between Reactive Oxygen Species and Antioxidants

The body experiences oxidative stress when the the production of reactive oxygen species exceeds the activity of the antioxidant defense system.

So, a lot of activity has been expended to find safe, effective, natural ways to increase antioxidants in the body.

Most people know that foods containing beta-carotene, vitamin C, and vitamin E have proven antioxidant properties. The trace mineral selenium is often included in this group. In addition, the body itself productes antioxidants such as glutathione, ubiquinol, and uric acid as part of its normal activities.

Hydrogen as an Antioxidant

But, hydrogen is even more basic than complex molecules such as vitamins and selenium in neutralizing a reactive oxygen species. Hydrogen can combine with reactive oxygen species to prevent DNA damage. But, how do we introduce hydrogen into the body? Hydrogen is present in the atmosphere is minute quantities, only about one part per million.

There are a number of ways to introduce hydrogen into the body. Some of these techniques include:

- Inhaling hydrogen gas
- Drinking hydrogen dissolved water (hydrogen water)
- Taking a bath in hydrogen water
- Injections of hydrogen-dissolved saline
- Dripping hydrogen saline into the eyes
- Modifying intestinal bacteria to produce more hydrogen

While introducing hydrogen into the body may seem new or trendy, it has been used for many years in gas mixtures used for deep diving and for prevention of decompression sickness.

Inhaling hydrogen gas has a rapid effect and is good for acute oxidative stress. But hydrogen in the air is flammable. This limits its use for therapeutic effects mainly to medical facilities. Outside of controlled environments in medical institutions, hydrogen is normally delivered by dissolving hydrogen in water, usually through bubbling or other direct contact with hydrogen.

Water with dissolved hydrogen (but low in dissolved oxygen) has a high pH. It has the ability to scavenge reactive oxygen species and protects the body from oxidative damage.

Mouse studies of dissolved hydrogen indicate, among other benefits, that it reduces atherosclerosis, improved kidney function, and improves brain injuries.

Antioxidants such as vitamins C and E help with glycemic control in both humans and animals. So, if dissolved hydrogen can act as an antioxidant, it may also help with glycemic control.

Clinical Studies of Hydrogenated Water

While many studies have been done on mice and rats, here are a couple of studies on humans.

In one study 30 patients (24 who had type 2 diabetes which was controlled with diet and exercise and 6 who were insulin resistant) were enrolled in a randomized, double-blind, placebo-controlled, crossover study to determine the effects of hydrogen-rich water. Half these patients consumed 900 mL of hydrogen-rich water and the other half were provided 900 mL of placebo water daily for 8 weeks. After a twelve week "wash-out" period the crossover period began were the groups switched water types.

Various biomarkers of oxidative stress, insulin resistance, and glucose metabolism were measured before and after the 8 week trial.

Patients receiving hydrogenated water showed significantly lower levels overall of LDL cholesterol and specifically the dangerous small dense LDL as well as significantly lower urinary 8-isoprostanes (an indicator of oxidative stress).

Patients on hydrogenated water also showed increased plasma levels of adiponectin (indicating enhanced insulin sensitivity) and extracellular-superoxide dismutase (important for antioxidant defense). In addition, in 4 of the 6 patients with insulin resistance, the final glucose tolerance test showed normal.

In another study of 20 patients with potential metabolic

syndrome (displaying one or more of the metabolic syndrome characteristics). Subject consumed 300-400 mL of hydrogenated water 5 times per day resulting in a total of 1.5 L to 2.0 L of hydrogenated water.

Various measures were made at the start, after 4 weeks and after the 8 week trial period.

After 4 and 8 weeks, the concentration of urinary TBARS (a measure of oxidative stress) decreased significantly from the start of the trial. There was an increase of SOD (superoxide dismutase) indicating increased antioxidant defense. There was a significant increase in good HDL cholesterol as well as a decrease in the ratio of total cholesterol to HDL cholesterol. This study showed no statistically significant difference in fasting glucose levels.

Considerations in Purchasing a Hydrogen Water Generator

You will find hydrogen water generators priced from about $40 on up. Some expensive versions cost several thousand dollars.

They all work by electrolysis of water. When positive and negative electrodes are placed in water, the water molecule (H_2O) is broken up with hydrogen bubbling up from the negative electrode and oxygen bubbling up from the positive electrode.

Cheaper hydrogen water generators place both electrodes at the bottom of the water container so both hydrogen and oxygen bubble up into your water. Because water normally contains some salts, you will also get chlorine bubbling up into your water.

Models costing over $100 often use Proton Exchange Membrane or PEM technology. Here the positive (oxygen) and negative (hydrogen) electrodes are separated by a membrane that allows

hydrogen to bubble up into your water container, but oxygen and chlorine bubbles into another chamber where it is discharged into the air.

This video explains this concept.

Hydrogen water may NOT be safe to drink! Find out WHY

Conclusions About Hydrogen Water You Can Use

Many studies have shown the potential for hydrogen to act as an antioxidant and defend against oxidative stress.

You probably already take vitamins C and E to help combat oxidative stress, slow aging, and help prevent many of the common diseases of aging. And now you can add hydrogen water to your tool box.

More oxygen generators are appearing on the market. Be sure to choose on with PEM technology to get the cleanest, purest hydrogen water for you and your loved ones.

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Medical Marijuana Background What You Need to Know About Medical Cannabis

Cannabis, or marijuana (*Cannabis sativa*) is known for its psychoactive properties and its illegal recreational use to get "high" or "stoned". The main psychoactive chemical in cannabis is tetrahydrocannabinol, commonly known as THC. This was isolated in 1964. Another important component, nonpsychoactive cannabidiol (CBD), was identified in 1963. All together, there are more than 60 pharmacologically active compounds called "cannabinoids".

In the 1980s the endoCannabinoid system was discovered. It is a complex neurotransmitter or signalling system consisting of receptors, endogenous ligands and enzymes that exists throughout the central nervous system (including the brain) as well as the peripheral nervous system.

This endocannabinoid system has been found to express elevated signalling in various neurodegererative diseases including Parkinson's disease, Alzheimer's disease, allergic encephalomyelitis and multiple sclerosis. The purpose of this activation seems to be to reduce neuronal hyperactiviety and local inflammation which could cause damage as well as to reduce tremors and spasticity.

People Who Use Recreational Cannabis

By recreational use we usually mean “smoking weed” that is high in the psychoactive chemical THC.

THC has been shown to increase anxiety levels and present symptoms of psychosis in healthy individuals. As a contrast, CBD has been shown to reduce anxiety and depression, mediate pain perception, reduce nausea and vomiting, improve sleep, reduce inflammation, and displays anti-psychotic effects.

Many recreational users of maerijuana simply concentrate on the THC levels and ignore CBD levels in the product they use. But, CBD levels may be important in the long term effects of marijuana use.

A study was done to analyze hair samples of 140 people. They were separated into groups based upon whether their hair showed THC (20 individuals), THC+CBD (27 individuals), CBD (8 individuals), or none of these compounds (85 individuals). The CBD only group was too small to analyze and was dropped from the analysis.

The short form of the Oxford Liverpool Inventory of Life Experiences was administered to the remaining 132 individuals. This questionnaire investigates ways of thinking including aberrations, magical thinking, hallucinations, poor decision-making, social anxiety, impulsive, anti-social, and eccentric forms of behavior.

The group with only THC in their hair showed a higher level of “unusual experiences” (such as aberrations, magical thinking, hallucinations) than the TCH+CBD group ($p<0.021$) and a very significant high level of “unusual experiences” compared with the non-cannabis group ($p<0.001$).

This study indicates the negative effects of use certain

strains of marijuana and suggests that CBD could have a psychologically protective effect on marijuana users.

Another more recent study confirmed that when THC and CBD were administered togther, CBD was efficient in blocking most of the effects of THC, including reducing anxiety.

Marijuana Strains

Not all marijuana plants are the same. Like most plants, marijuana has been bred to produce varying levels of psychoactive THC and nonpsychoactive cannabidiol or CBD.

Some recreational marijuana strains with high levels of THC include

- Cookies Kush (15-18% THC and 3% CBD)
- Violator Kush (19-23% THC and 2% CBD)
- Vanilla Kush (up to 20% THC and 1% CBD)

Medical marijuana strains high in CBD and low in THC include:

- ACDC (up to 20% CBD and 0.42% to 6% THC)
- Charlotte's Web (up to 20% CBD and less than 0.3% THC)
- Ringo's Gift (up to 20% CBD and as low as 1% THC)
- Harle-Tsu (up to 22% CBD and less than 1% THC)

Medical Marijuana

Photo by Jeffrey Beall

The Chinese used marijuana more than 4600 years ago for ailments such as cramps, joint and menstrual pains. But, it

wasn’t until the 19th century that western doctors began an investigation of marijuana. And, it was only in 1964 that the chemical structure of psychoactive component THC was identified.

It’s actually the ratio of nonpsychoactive cannabidiol (or CBD) to the psychoactive substance tetrahydrocannabinol (or THC) that determines therapeutic vs psychoactive effects. Those strains with low THC will not enable users to get “high.” Most people use medical marijuana with high levels of CBD. But, even THC can be beneficial for treating nausea from chemotherapy and weight loss from AIDs.

Medical marijuana laws typically allow patients with a physician recommendation to obtain marijuana at state supervised dispensaries. One study has found that states with such dispensaries have reduced opioid abuse and opioid deaths.

A doctor’s case for medical marijuana | David Casarett

Physician David Casarett was tired of hearing hype and half-truths around medical marijuana, so he put on his skeptic’s hat and investigated on his own. He comes back with a fascinating report on what we know and what we don’t — and what mainstream medicine could learn from the modern medical marijuana dispensary.

Here are just a few of the hundreds of published studies that show the effectiveness of medical marijuana.

Medical Marijuana for Epilepsy

For many years only anecdotal evidence or small clinical trials were available to indicate the usefulness of medical marijuana for use in seizure control for epilepsy.

The fist large study involved 162 patients who were studied for the complete 12 weeks of the program. A number of the patients experienced adverse effects and stopped taking oral cannabidiol, leaving 137 patients who were included in the efficacy evaluation. Patients were 1-30 years of age, all with childhood onset epilepsy.

The main goal of the study was to determine the safety, tolerability and effectiveness of cannabidiol.

In addition to their normal antiepileptic drugs, patients were given 2-5 mg of oral cannabidiol per kilogram of body weight per day in two divided doses. Over time the dose was increased until a maximum dose of 50 mg/kg or the patients reached intolerance. The mean dose was 22·7 mg/kg.

The patients and caregivers monitored and recorded the seizures of a patient during the study. The seizures affecting the motor complex were of particular interest in this study.

During the final four weeks of the trial, 15 (11%) patients were free of all motor seizures and 9 (7%) patients were free of all seizure types. In addition, 39% of the patients had a reduction of 50% or more in motor seizures and 21% saw motor seizures drop by 70% or more. The average person experienced a 34·6% decrease in seizures using cannabidol.

This trial demonstrated a clinically meaningful reduction of seizures in most patients with safe and tolerable doses of cannabidol.

Medical Marijuana for Anxiety and Sleep

Various studies have shown the positive effects of cannabidiol on posttraumatic stress disorder (PTSD). This case of a ten year old girl illustrates this effectiveness.

This girl's mother used marijuana for the entire pregnancy. She was molested by an 11 year old boy when she was 3 years old. She received very little supervision from her parents. Her mother was addicted to methadone, suffered from alcoholism, bipolar disorder and depression. Her father died in a motor vehicle accident and she was cared for by her grandparents who received permanent guardianship.

This girl, at age 10, was evaluated and received a diagnosis of PTSD secondary to sexual abuse. She exhibited anxiety, insomnia, outbursts at school, had suicidal thoughts, and displayed self-destructive behaviors.

She was put on CBD supplementation with 25 mg at bedtime. She could use a sublingual spray during the day to help combat anxiety.

Gradually her sleep quality and quantity increased and here anxiety decreased. After 5 months the girl was sleeping must better and was able to handle the new school year without difficulties. No negative side effects of the CBD oil were noted.

The ultimate goal in this treatment is to slowly reduce the use of CBD oil and move into lifelong coping behaviors such as yoga, meditation and other such activities.

Conclusions You Can Use

While some strains of marijuana plants have concentrations of THC that will get users "high," other strains will not.

The compound in the marijuana plant call CBD is effective in treating a number of ailments.

Access to medical marijuana is another option for treating numerous ailments and should be made available to the medical community.

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Vaping Health Risks – Hidden Health Risks of E-Cigarettes

Is Vaping Safe? E-cigarettes are battery powered devices that heat a liquid to form a vapor that you inhale. While that vapor does not contain the tars found in burning tobacco cigarettes, the vapor does contain other chemicals that could cause harm.

The liquid typically contains combinations of propyleve, glycol and glycerin. Liquids may also come with varying levels of nicotine and flavors that are carried along with the vapor for inhalation.

And, while electronic cigarettes do not provide your lungs

will all the tars or alkaloids of conventional tobacco cigarettes, they are not a safe way to obtain nicotine.

The market for e-cigs is booming. It is estimated that by 2023 the market will be worth $48 billion. Because these devices are not traditional cigarettes, the tobacco companies have gotten back into advertising their brands of these nicotine delivery systems in a big way. Some of these big tobacco electronic cigarette brands include VUSE, Vype, Mark Ten, and Blu.

E-Cigarettes : Welcome Back, Big Tobacco – the fifth estate

Big Tobacco is trying clean up its image, moving into the booming e-cigarette business which continuing to peddle the deadly tobacco products. This has left public health officials in Canada, the U.K. and the US concerned.

Photo by kirinqueen

Hundreds of studies have been done on e-cigarettes. Many are small clinical trials and many are trials that lack an adequate placebo.

Unfortunately, many of these studies have been sponsored by

electronic cigarette manufacturers. They tend to study only one brand of electronic cigarette, and often only one model. The data that is analyzed tends to bias the results, favoring e-cigarettes and demonstrate a severe conflict of interest. This reduces the credibility of their findings.

In addition, since the vaping technology is relatively new, long term studies of its effects have not been done. For many years even traditional tobacco cigarettes were thought not to be harmful.

Nonetheless, a number of relevant facts about e-cigs have emerged.

Nicotine Dependence

As in conventional tobacco cigarettes, nicotine is normally present in e-cigarettes. A typical tobacco cigarette allows about 2 mg of nicotine to be absorbed into a smoker's system. The strength of nicotine in an e-cigarette depends on the concentration of nicotine in the "e-liquid" to be vaporized. The strength of nicotine in the e-liquid is measured in mg/mL (milligrams of nicotine per milliliter of liquid) or sometimes percent by weight. E-liquid typically provide nicotine at concentrations between 0 mg/mL to 18 mg/mL. Your actual dose of nicotine will depend on the concentration of nicotine in the e-liquid, the frequency and depth of inhalation, and how long you "vape."

Nicotine provides stimulating effects with mood altering psychoactive effects and activates the brain chemical dopamine. These effects are produced in the brain and begin only seconds after inhaling nicotine in the lungs.

Since the half-life of nicotine in your system is about 2 hours, the pleasant effects of nicotine soon wear off and you need another dose or "fix" of nicotine. The almost immediate effects and the inevitable pleasurable reduction in those

effects are what produce the addictive, compulsive desire for further exposure to nicotine.

Your cravings for nicotine will continue whether you use conventional tobacco cigarettes or e-cigs.

The Food and Drug Administration (FDA) requires the following warning label statement on all electronic cigarette packages:

> ***"WARNING: This product contains nicotine. Nicotine is an addictive chemical."***

Vaping: A Way to Stop Smoking or a Way to Start a Nicotine Habit

A review study of 38 scientific investigations into the relationship between using electronic cigirettes and smoking cessation provided some surprising findings. These studies found that the odds of actually quitting smoking through the use of e-cigarettes was 28% lower compared to those who did not use e-cigarettes.

In other words, the use of electronic cigarettes caused significantly less quitting among smokers.

A recent study looked at 1357 hospitalized adult cigarette smokers who planned to stop smoking. Followup of the patients after release from the hospital showed that those who used e-cigarettes were less likely to have actually quit smoking than those who did not use electronic cigarettes.

The Mark Ten site has a clear indication that e-cigarettes have not been shown to help people quit the nicotine habit:

> *WARNING: This product is not a smoking cessation product and has not been tested as such. This product is intended for use by persons of legal age or older, and not by children, women who are pregnant or breast feeding, or persons with or at*

> *risk of heart disease, high blood pressure, diabetes, or taking medicine for depression or asthma. Nicotine is addictive and habit forming, and it is very toxic by inhalation, in contact with the skin, or if swallowed. Nicotine can increase your heart rate and blood pressure and cause dizziness, nausea, and stomach pain. Inhalation of this product may aggravate existing respiratory conditions. Ingestion of the non-vaporized concentrated ingredients in the cartridges can be poisonous.*

And, while the idea is that vaping is less harmful than smoking, there seems to be some equivalent harm. A study showed that nearly equal harm was caused by cigarette smoke and e-cig vapor within the body causing vascular injury and inflammation and other negative effects on blood flow. Like tranditional cigarettes, the vapor from e-cigs has also been shown to contain the carcinogen formaldehyde.

Teen Vaping

While there are age limits for purchasing electronic cigarettes, this does not seem to hinder young teens from obtaining these devices. During the last 5 years their use by underage teens (and even pre-teens) has grown dramatically. Way back in 2015, 1 in 6 high school students reported vaping in the previous month.

Of the teens in one survey who were non-smokers before using e-cigarettes, a fifth had “graduated” to smoking traditional tobacco cigarettes.

Juuling: New high-tech fad among teens

While we might like to think of teens as young adults, they are not adults. The teen body and brain are still developing. In fact, brain development continues until about age 25. Exposure to substances like nicotine as a teen can harm the

teen’s developing brain.

Even in zero nicotine e-liquids there are flavorings that are popular with teens. Some of the flavoring chemicals in e-liquids like diacetyl (providing an intense buttery flavor) have been linked to lung disease. The National Institute for Occupational Safety and Health indicates diacetyl is hazardous when heated and inhaled. Other flavorings such as cinnamon have been found to have cytotoxic effects.

Heavy Metals and Pollutants in E-Cigarette Vapor

The electronic cigarette is a mechanical device with a heating coil and fiberglass wicks that vaporizes a fluid so it can be inhaled. Various metals (probably from wires and soldier joints) are found in these vaporizers.

So, it’s no surprise that metallic compounds are found in the vapor. Studies have found lead, chromium, nickle, mercury, zinc, tin, silver and aluminum in the vapor of various electronic cigarettes. A study found cadmium, nickel and lead in the vapors of the all the electronic cigarettes tested. Another study found a doubling of aluminum in indoor air after vaping.

Some of these particles (tin, chromium, and nickel) have been detected as ultrafine particles, often called nanoparticles. The small size of these particles can allow them to pass into cell membranes. The large surface area for a given weight makes them more reactive with material they contact. For many such particles there has been little or no clinical investigations into their effects. The long term effects have not bee made clear, but many believe the effects may be toxic.

A recent study found vaping in a thoroughly ventilated room found high concentrations of particulate matter, volatile

organic compounds, a 20% increase in carcinogenic polycyclic aromatic hydrocarbon, and a 2.4 fold increase in airborn aluminum. Vaping is not emission-free and does pollute the air.

Conclusions You Can Use

Vaping is a trend among teens and adults. Thousands of harmful chemicals in traditional tobacco smoke are not found in the vapor of electronic cigarettes. However, a number of chemicals and particulates are found in vapor. And, many of these have not been tested for their long term effects.

Because of harmful chemicals in e-cigarette vapor, vaping cannot be considered a healthful activity. Studies have shown that e-cig vapor contains respiratory irritants and toxicants.

Nor does using e-cigs appear to help a smoker quick smoking. And, for non-smokers, vaping may lead to actual smoking of traditional tobacco cigarettes.

The best healthful advice is to avoid using electronic cigarettes.

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