Smoking and Vaping— What You Thought You Knew is Not a Foregone Conclusion

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With research mounting, alarming facts about both methods of inhalation that are not commonly known, posing a very serious threat to user’s health, and those exposed to it.

(Newswire.net -- April 28, 2016) -- Anyone who has watched old movies, particularly the 1930s, 40s, and 50s cinema, would discern Hollywood’s torrid affair with cigarette smoking. Silver screenland’s preeminent male actors lighting and smoking a cigarette was perceived as rebellious, uninhibited, and charmingly stoic.

Tobacco plants were seen 18,000 years ago by migrant people who crossed the Bering Strait, and spread across continents into the North American region. Celebrated throughout most of history for its medicinal and ritualistic characteristics, thousands of years of human evolution has changed our relationship with tobacco’s dissemination and cultivation.

By the time the American Civil War was active in the 1860s, America advanced a different type of the economic cigarette by placing it in the hands of soldiers. This tobacco variety was light in color, more aromatic, and sweeter. After trying a few of the ‘unusual tobacco’ brand, unfamiliar smokers felt the urgent need to puff on another, and then another. It was now clear to the cigarette production industry they had created a new powerful, and profitable vice.

At the turn of the 20th century, despite some medical objections being raised, and voiced concerns regarding their detriment by Thomas Edison and Henry Ford, mass cigarette production continued.

The First World War set a new record when American production of cigarettes soared to 18 billion between 1914 and 1918. The soldier’s desire for the distinct tobacco fix grew into a crusade to provide free cigarettes to soldiers. The narcotic effect was considered advantageous to combat loneliness for those on the front line. During World War II, women worldwide had joined men with their appetite to smoke. And soldiers gravitated heavily to free cigarette campaigns. At some point during post-war Europe, cigarettes replaced currency in the black market.

As cigarette smoking’s presence became more widespread, creeping its way into cinematography, mainstream advertisers promoted these health crippling sticks as an aid to stay slim and lean. In the early 1900s, lung cancer was seen as rare. Researchers attributed it to some form of influenza, tuberculosis, exposure to irritant gases, or other chronic factors.

Understanding the impact cigarettes had on health specifically changed after E. A. Potter and M. R. Tully published their statistical findings in the American Journal of Public Health in 1945. Their studies revealed the higher rate at which cancer was being diagnosed in smoking patients.

Even though the Federal Trade Commission (FTC) proposed that a large, quite visible label, with a more specific alarming warning be placed on all cigarette manufacturer’s packages and advertisements in 1964, Congress preempted the FTC’s effort by passing the Cigarette Labeling and Advertising Act of 1964. This act required labels to display a ‘smaller in size’, mere cautionary statement, and excluded this requirement for cigarette advertisers.

It would take another 20 years for Congress to do what was necessary previously. In 1984, the Comprehensive Smoking Education Act necessitated four rotating warnings on all cigarette packages and advertisements.

It is understood by anyone who has paid attention to the consequences of smoking, that it increases one’s risk of
developing lung cancer, chronic obstructive pulmonary disease (COPD), strokes, heart disease, and secondhand smoke exposure ailments. It is linked to 10 other types of cancer, including colon, cervix, liver, stomach and pancreatic cancer.

It also contributes to macular degeneration and blindness, type 2 diabetes, reproductive problems, and low birth-weight babies—breaking down the integrity of practically every health system in the human body.

Even though there has been effective strategic interventions, and notable progress with regard to reducing the prevalence of smoking worldwide, The Centers for Disease Control and Prevention’s (CDC) Morbidity and Mortality Weekly Report states that 19 per cent of American adults (age 18 and older) in 2011 smoke traditional cigarettes, and there are about 43.8 million conventional smokers globally. The U.S. statistic does not reflect middle school aged youths, and those under 18.

Also, these findings do not annotate people who choose to roll their own unfiltered cigarettes, assuming they are safer.

For those who are challenged to quit, the trend seems to be more towards reducing the number of cigarettes smoked daily, or they transition to vaping electronic cigarettes (e-cigs), which poses a unique set of health risks not commonly known. Most smokers are not fully aware of what they are inhaling through either method.

What seems to be understood to a limited extent, is the effect of nicotine, which is present in, and happens to be the primary source of addiction in both e-cigs and traditional cigarettes, and primes the brain to become addicted to other substances. The pharmacokinetic properties of nicotine is what leads to its overconsumption.

Cigarette smoking or e-cig vaping produces a rapid distribution of nicotine to the brain. Nicotine (drug) levels peak within 10 seconds of inhalation. The effects of nicotine dissipate so quickly, along with the dependency-creating ‘desired feeling’, the smoker continues to smoke/vape to maintain the nicotine dosage level, which constructs the drug’s pleasurable effects, and curtails withdrawal.

According to Jennifer Cameron of the College of Nursing at Washington State University in Spokane, and her colleagues, nicotine can be absorbed in the gut or through the skin. As little as 30 to 60 milligrams/mg. (0.001 to 0.002 ounce) of nicotine can kill an adult. A mere 10 mg. may kill a child.

In its new study, Cameron’s team showed that a small vial of e-cigarette liquid can contain 100 mg. of nicotine. How much a vial contained was not always reported accurately on a product's label. If a child or adult consumed much of what was in a vial, they could die, the team concluded.

Their findings appear in the January, 2014, issue of Tobacco Control. Some e-cig manufacturers have designed their products to resemble tobacco cigarettes, and compare their nicotine delivery to conventional cigarettes. The U.S. Food and Drug Administration (FDA) describes e-cigs as ‘electronic nicotine delivery systems’, or ENDS.

According to an August, 2015, publication from the American Journal of Preventive Medicine, exposure to nicotine in e-cigs or ENDS, during periods of developmental vulnerability (young people and fetuses), can impair development of neurons and brain circuits, leading to changes in brain architecture, chemistry, and neurobehavioral function, and may impair or dysregulate non-neuronal cellular function (brain development and function).

Nicotine in the human body simply performs and influences the way it does regardless of age. Although nicotine is of great concern in young people, since it compromises or debilitates what they are on docket to healthfully develop physiologically, in older adults, it alters brain chemistry, constricts blood vessels, increases blood pressure, stimulates the heart, and raises blood fat levels.

According to the National Institute on Drug Abuse (NIDA), high doses of nicotine (heavy smoking or vaping; exposure to heavy smoking or vaping) is similar to what is found in insecticide sprays leading to toxicity, which can cause vomiting, tremors, convulsions, and even death. One drop of pure nicotine can kill a person. Nicotine poisoning has been reported from accidental ingestion of tobacco products on the part of children and pets. Death usually results in a few minutes from respiratory failure caused by paralysis.

The CDC states that e-cigs have now surpassed traditional cigarette use among middle and high school students, causing concern among public health officials who wonder if they are better or worse for lung health compared to
Research revealed in the 2015 edition of the *American Journal of Physiology—Lung Cellular and Molecular Physiology*, indicates that nicotine alone is sufficient enough to alter the cells that make up the lining of the lungs (endothelial cells), which can lead to lung injury and inflammation, affecting its shape and function.

For many e-cig brands, puffing activates the battery-powered heating device, which vaporizes (vaping) the liquid in the cartridge. Irina Petrache, PhD., physician and lung specialist at Indiana University at Indianapolis, found nicotine caused inflammation in lung tissue. It also reduced that tissue’s ability to serve as a barrier to foreign substances. “Even an e-cigarette liquid having ‘no nicotine’ disrupted the barrier function of lung cells,” Petrache’s team stated. They attributed this to other solvents and potentially toxic materials.

Also, the refillable cartridges potentially exposes the user to higher levels of nicotine from traces continually left behind. Further complicating these concerns, are additives that are included to increase the absorption and effectiveness of nicotine which directly affects the nervous system. This especially applies to cigarettes.

Nicotine-free e-cig’s solution and vapor contain a lung harming substance called acrolein. This substance has been shown to damage the lungs by attacking the molecules that hold endothelial cells together. An article published in the *New England Journal of Medicine* shifts this discussion into more serious concerns. Their findings detail how the propylene glycol in the pre-vaping liquid breaks down into formaldehyde.

Formaldehyde is considered a Group 1 carcinogenic compound (cancer causing) to humans according to the International Agency for Research on Cancer. In toxicology, it is not the presence of something like formaldehyde that matters, it is the actual dose. The researchers found that an e-cig user vaping at a rate of 3 milliliters/ml per day (considered average), would inhale 14.4 mg. of formaldehyde per day in formaldehyde-releasing agents.

To further illustrate the potency of this carcinogen, an average pack of tobacco cigarettes (20 of them) would deliver 3 mg. of formaldehyde to the smoker. In effect, the e-cig vaper is inhaling nearly 5 packs of cigarettes worth of formaldehyde, targeting sensitive areas of the body such as the lungs, tongue and throat.

Cigarette’s profile is notably terrifying. There are over 4,000 chemicals in cigarettes, approximately 40 of which are known carcinogens, to include: arsenic, sulfuric acid (car batteries), cadmium, hydrogen cyanide (gas chamber poison), butane (cigarette lighter fluid), ammonia (cleaning products), tar (passes through filter and blackens lungs), and carbon monoxide (poisonous gas), among a ghastly long list of substances.

Interestingly, some of the carcinogens found in cigarettes are in e-cigs and their emissions as well, such as: acetone, tin, acetaldehyde, benzopyrene, propylene glycol, ultrafine liquid and various metal particles, and nicotine. For brands that are advertised as nicotine-free, if the product does not specifically state it has 0 percent nicotine, then varying amounts of nicotine are present depending on the product.

The German Cancer Research Center in Heidelberg found nickel, chromium, and lead in the aerosol of e-cigs. The German Research Foundation, and the International Agency for Research on Cancer (IARC), classify these substances as carcinogenic in large enough quantities. They measured higher levels of nickel than what is known to be present in cigarettes. These particles fleck off the solder joints or metal coils in the devices when heated. Nanoparticles (tiniest bits of metal) can travel deep into the lungs, creating starting points for respiratory ailments, or exacerbating existing ones.

If several people in a room are using e-cigs at the same time, this results in considerable indoor air pollution due to accumulation. It needs to be understood that many things that can be eaten, for instance, have a different toxicity profile when inhaled through the lungs.

Also, many substances that are ingested occasionally, cannot be compared to substances that are inhaled constantly. This is a huge scientific aspect of toxicology that cannot be sufficiently addressed in an abbreviated article.

When you inhale any toxic (or potentially toxic) chemical, particle, or substance, the impact of the dose you receive depends on four factors: (1) the level of concentration; (2) how hard (fast and deep) you are breathing, which is contingent upon physical exertion; (3) how much of the chemical that is inhaled stays in your lungs, and is absorbed into your bloodstream; and (4) how long the exposure lasts.
Potentially harmful substance, or chemical exposure that continues over a long period of time is hazardous since some chemicals accumulate in the body, or because the damage does not have a chance to be repaired.

The combination of dose and duration is called the ‘rate of exposure’. The body has several systems, with the greatest ‘work load’ being placed on our liver, kidneys, and lungs, that change chemicals to a less toxic form (detoxify) and eliminate them. If your rate of exposure to a chemical exceeds the rate at which you can eliminate it, some of the substances/chemicals will accumulate in your body. This eventually leads to some type of health malady—mild or severe.

To compound these considerations, new information out of Harvard University was released in December, 2015, in the Harvard Gazette that irrefutably links e-cigs to lung disease. So much focus has been placed on the combustion element of smoking and nicotine, that other health hazards posed by the device were eclipsed.

They discovered health threats associated with the chemical flavorings used in e-cigs. One of the flavoring chemicals, diacetyl, has been linked to cases of severe respiratory disease, and it is found in more than 75 percent of flavored e-cigs, and refill liquids tested by researchers at Harvard T. H. Chan School of Public Health.

Additionally, two other potentially harmful compounds were found in many of the tested flavors, which included varieties that better appeal to young people such as cotton candy, ‘fruit squirts’, and cupcake.

Not only was this study published in Environmental Health Perspectives, The Occupational Safety and Health Administration (OSHA) has warned workers about diacetyl because of the association between inhaling the chemical, and the debilitating respiratory disease bronchiolitis obliterans (inflammation obstruction in lungs, and severe scarring that blocks airways)—commonly known as ‘popcorn lung’.

This condition earned its name since it first appeared in workers who inhaled artificial butter flavor in microwave popcorn processing facilities. Harvard University’s press release emphasizes that the FDA has not tested e-cigs for safety and their potential health effects, and, they are not currently regulated. There are currently about 500 brands of e-cigs, and more than 7,000 types of flavored e-cigs and e-juice on the market awaiting further research and regulation.

Surveys in 2014 showed e-cigs had become the most commonly used tobacco product by middle and high school students. It is called a tobacco product because its nicotine comes from tobacco. Articles have been written praising e-cigs for saving the thriving of tobacco farming.

Although nicotine can be produced synthetically in a lab, this version has been discouraged because several chemicals in the synthetic production process are listed as carcinogens (cancer causing).

Mitch Zeller of the FDA, and director of the Center for Tobacco Products in Maryland, stated recently: “Cigarette and cigar use has been falling over the past decade. But that good news is now being threatened by the bad news of this dramatic increase in the use of e-cigarettes.” He added: “I can say definitively, nicotine is harmful to the developing teenage brain. And no teenager, no young person, should be using any tobacco or nicotine-containing products, these include e-cigarettes.”

Researchers at the University of North Carolina at Chapel Hill asked three teenagers, ages 16 and 17, to buy bottles of e-liquid online. They used their real names, addresses, and social security numbers, but provided bogus birth dates showing they were in their mid-20s. Only four of 120 vendors rejected them.

There are a considerable number of articles on the Internet endorsing e-cigs as though they are the cigarette savior—scoffing at, and minimizing research findings. These articles and blogs go about, in some cases in great length, the business of putting some very creative spins on credible examinations.

It is unlikely that these publications would risk their reputations by publishing false findings. In this vain, it appears their commitment is to increase awareness about the role the substances in e-cigs play in your body, so you can make informed decisions, and to assist in protecting your health.

Characterizing e-cigs as the lesser of two evils compared to cigarettes is probably a fair impression at this stage in e-cig studies. However, the research data indicating the manner in which they are detrimental should not be ignored.
There are many reasons why people smoke or vape. Most smokers or vapers begin in their teenage years and continue into adulthood. Many young people think it is cool, and it is part of what takes place in their social circles. Still others enjoy the excitement of experimenting—particularly if it is forbidden.

In general, stress and pressure from personal, occupational, and economic affairs has a lot to do with why people of any age smoke, along with weight control. Nicotine’s effect on specific brain receptors has been documented to suppress one’s appetite. Some people say smoking/vaping helps them to relax, or they feel energized.

For others, the ritual of obtaining, handling, smoking or vaping, as well as the taste and or smell of the cigarette or e-cig, is very appealing, and also contributes to the difficulty to withdrawal. Typical withdrawal symptoms include irritability, nicotine craving, depression, anxiety, cognitive and attention deficits, sleep disturbances, and increased appetite.

Since smoking and vaping presents a variation of health concerns or injurious health effects, the goal should be to quit. Quitting is challenging for many people. Speak with a knowledgeable healthcare practitioner about natural products or methods that have a healthy, uplifting effect on the human brain and body.

Throw away your cigarettes/e-cigs, lighters and ashtrays (if this applies). Exercise more to improve your health, and to offset the potential increase in appetite, if weight gain is a concern. Confer with a qualified healthcare provider about what exercises are safe for you based on your age, and health report.

Stay active. Get your hands busy with a pen or toothpick. Hang out with non-smokers. Get as much rest as possible, and avoid too much sugar. Lack of sleep and too much sugar can trigger the desire to smoke or vape. Change your typical routines, and drink a lot of water.

Do not beat yourself up. Quit one day at a time. Days turn into months. Months turn into years.

Picture yourself 10, 20, or 30 years down the line, and envision how you want to look and feel. And last, congratulate yourself in healthy ways for every week you have remained a non-smoker or non-vaper.
