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A Reader's Digest Report to Consumers:
Latest facts and figures about America's growing
tobacco habit — 400 billion cigarettes a year

HOW HARMFUL ARE CIGARETTES?

By Roger William Riis

IN ALL the history of human habit, there have been few changes so remarkable as the tidal-wave increase of cigarette smoking in the United States. Within a single generation, a new habit has laid hold upon an entire people to an extent which we do not begin to realize, and with effects which we certainly do not understand.

Last year 60 million Americans consumed 400 billion cigarettes. Every year, some 800,000 non-smokers join the smoking ranks. Two out of every three men, two out of every five women, one out of every seven boys of 14 smoke cigarettes. The average consumption is 19 a

day. We spend some four billion dollars a year on tobacco products and supplies — twice as much as we pay all the public-school teachers in the United States.

Up and up runs the graph at a towering angle, with no sign of leveling off. We are, at a lively pace, engulfing ourselves in one giant nation-wide cloud of cigarette smoke.

What is this substance which we breathe into our mouths and lungs in such stupendous clouds? It contains a number of ominous-sounding chemicals. Medical men, however, have not proved a case against them. But two of the chemicals are under grave suspicion: benzo-pyrene, which

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chiefly affects the respiratory tract, and nicotine.

Nicotine is the essential ingredient of tobacco. It is what makes tobacco tobacco and not just another weed.

When one smokes, most of the nicotine escapes into the air. About a third gets into the mouth, where a little is absorbed. Of what goes into the lungs, perhaps a fifth is absorbed. The effect of smoking a cigar is equal to that of four or five cigarettes. A pipe gives one a trifle more nicotine than does a cigar.

The hotter the burning surface, the more nicotine is taken into the system. Thus, the faster one smokes, the more nicotine one gets; smoking twice as fast results in ten times as much nicotine. And the closer to the end of a cigarette one smokes, the more nicotine also, because the butt, having filtered the first part of the cigarette, has more than its share of nicotine.

In pure form nicotine is a violent poison. One drop on a rabbit's skin throws the rabbit into instant shock. The nicotine content of a trifle more than two cigarettes, if injected into the blood stream, would kill a smoker swiftly. If you smoke a pack a day, you inhale 400 milligrams of nicotine a week, which in a single injection would kill you quick as a bullet.

In factories which make nicotine insecticides, cases of acute poisoning occur now and then. One worker sat on a stool the concave seat of which held a little spilled nicotine. In less

than two minutes he fell to the floor, blue in the face, apparently dead. Rushed to the hospital, he recovered quickly, as one does from light nicotine poisoning. But when he returned to the shop and put on those nicotine-soaked trousers again, again he fell headlong on the ground, and had to be revived a second time.

Aware that nicotine is a killer, men have tried for years to keep it out of their systems while still enjoying the smoke. All types of artificial filters take out some nicotine. The kind which uses another cigarette as a filter is said to remove 70 percent; the kind which uses a silica-gel cartridge removes 60 percent, according to claims of the manufacturers confirmed by the American Medical Association. But with a filter one is likely to smoke a cigarette until it is shorter than if a filter had not been used — usually 20 percent shorter — and that extra length is the nicotine-filled butt.

Tests of various popular brands show that the average nicotine content of Virginia-blend cigarettes is around six percent; of Turkish cigarettes, one and a half percent; of the so-called "denicotinized" cigarettes, just over one percent; and, strangely enough, of the strong-looking West Indian cigarettes, least of all — .86 percent.

In the 400 billion cigarettes we smoke each year there are nearly 23 million gallons of nicotine. Administered with precision, this is enough to kill a thousand times the population of the United States — a wild

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idea, of course, but nevertheless suggestive of nicotine's lethal power.

If nicotine is such a poison, then why doesn't smoking kill us? Partly because the remarkably adjustable human body can gradually build up a tolerance for larger and larger doses of poison; partly because, in smoke, it is not accumulated in sufficient quantities. Just what the harmful effects of smoking are, the reader will judge for himself from the following evidence.

DO CIGARETTES irritate the throat? Yes, say some physicians. But other physicians say they don't. This conflict of expert opinion matters a great deal to smokers. Let us weigh various opinions and the factual experience back of them.

First, no doctor claims that smoking *soothes* the throat. The argument, as an editorial in *The Journal of the American Medical Association* puts it, hinges on "the extent to which cigarettes irritate the throat."

If you smoke a pack a day, you take in 840 cubic centimeters of tobacco tar in a year. That means that you have drenched your throat and lungs with 27 fluid ounces, or 15 full cocktail glasses, of tobacco tar containing benzo-pyrene.

The brown stain in filters or on your handkerchief when you blow smoke through it is not nicotine, for nicotine is colorless; it is incompletely burned tar products, like the soot in a chimney. Many physicians suspect that its main constituent, benzo-pyrene, though an irritant

rather than a poison, is a greater threat to heavy smokers than nicotine.

In 100 smokers who averaged 28 cigarettes a day, Dr. Frederick B. Flinn of New York found 73 with congestion of the throat, 66 with coughs, seven with irritation of the tongue. In the *AMA Journal*, Dr. Emil Bogen reported on 100 smokers; 30 complained of mouth irritation, and 30 (not necessarily the same) complained of coughing. Said Dr. J. L. Myers of Kansas City, "Nicotine irritates the mucous membranes of the respiratory tract. Tobacco tar injures those membranes."

It matters far more how you smoke than what you smoke, stated Dr. Arthur W. Proetz, nose and throat specialist of Washington University and editor of *The Annals of Otolaryngology and Laryngology*: whether you puff briskly or gently, how far down the butt you smoke, how long you hold the smoke in the mouth and lungs. Rapid smoking, reports Major C. W. Crampton in *The Military Surgeon*, "greatly increases the irritation" because it brings the smoke into the mouth at temperatures up to 135° Fahrenheit.

On the other hand, in hearings before the Federal Trade Commission, Dr. Alvan L. Barach of New York, a witness for a cigarette manufacturer, asserted: "I don't believe cigarette smoking produces any damage with respect to the lungs; I don't believe so-called cigarette cough is a reality."

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Yet there is probably no steady smoker who is not convinced that smoking does irritate his throat. Doctors familiar with this field comment on the persistent way smokers have of changing brands every so often in an incessant search for a less irritating cigarette.

DO CIGARETTES affect the stomach and digestion? Every smoker has noticed that a cigarette seems able to still the pangs of hunger for a while. This is not a delusion. The sensation of hunger is caused by contractions of the stomach walls and smoking can suppress these contractions.

By the same process, smoking interferes with the appetite and thereby with good nutrition. "We all have friends who have quit smoking and have promptly gained in weight and look like new persons," says Dr. Walter C. Alvarez, editor of *Gastroenterology* and specialist at the Mayo Clinic. "When a man smokes excessively he is less likely to eat well."

Excessive smoking may cause gastritis. By favoring an accumulation of acid secretions, it brings about heartburn. Relief comes in a matter of hours after the smoking stops.

Excess acidity of the stomach provides the kind of climate ulcers like. The most recent work in this field, done by New York University, showed that patients who continued to smoke during treatment for their peptic ulcers had more relapses than those who did not, or those who had never smoked at all.

At the great American clinics ulcer patients are told not to smoke. The Ochsner Clinic in New Orleans refuses to treat an individual unless he totally abstains from smoking. In Boston doctors had an interesting case some years ago, a man who had all the symptoms of duodenal ulcer. Even the X ray showed it. But an operation found no ulcer at all. The patient stopped smoking, under orders, and his "ulcer" left him. Three months later, feeling quite well, he took up smoking again, and back came the "ulcer." This time, however, the doctors ordered him off cigarettes completely. Since he stopped smoking, he has had no more "ulcers."

Anti-tobacco crusaders assert that pregnant women should never smoke. Doctors have worked on this point for years and are clearer about it than about almost any other aspect of smoking. The conclusion: Smoking does not do pregnant women any more harm, or any different harm, than it does anyone else.

Two pediatricians in Philadelphia analyzed mothers' milk for nicotine content. They found 1.4 parts in ten million among moderate smokers, 4.7 parts among heavy smokers. But they could detect no effect whatsoever on the babies.

Is SMOKING bad for athletes? Where staying power is demanded, tobacco lowers athletic performance. At the Aldershot Army School in England a three-mile cross-country run is a required event. Over seven years the performance of almost 2000

men was analyzed, in groups of heavy smokers, moderate smokers, non-smokers.

The heavy smokers, eight percent of the total, drew nine percent of the last ten places, but only five percent of the first ten. The moderate smokers, 73 percent of the total, got 62 percent of the first places and 83 percent of the last places. The non-smokers, 18 percent of the total, took 32 percent of the firsts and only seven percent of the lasts.

Non-smokers, in four years at Yale and at Amherst, grew more in height and weight and lung capacity than did their smoking colleagues. At Yale the increase in chest development of the abstainers was 77 percent better, their increase in height 24 percent greater.

At Wisconsin students were asked to hold a small metal point in a small hole, trying not to let it touch the sides. Electrical connections registered the number of times it did touch. Regular smokers were 60 percent more unsteady than non-smokers.

Coaches are almost unanimous in saying that muscular power is lowered and fatigue begins earlier in smokers. Knute Rockne was definite: "Tobacco slows the reflexes, and any advertising which says it helps an athlete is falsehood and fraud."

Which raises the question of change in the sugar content of the blood, due to smoking — that famous "lift" which cigarettes are supposed to give the weary mortal. Like many other

claims of cigarette advertising, this one was destroyed by research. Studies at the Harvard Fatigue Laboratory concluded that there was no significant change in blood sugar in connection with smoking, hence there was no lift.

Nowhere is there any medical evidence — despite the advertisements — that smoking improves an athlete's abilities.

WHAT DOES tobacco do to the heart? As to the long-run effects, medical opinions differ. As to the immediate effects of cigarette smoking upon the mechanism of the heart and upon the arteries and veins, there is no difference of opinion, for these effects are easy to observe and measure.

Smoking speeds the pulse by as much as 28 beats per minute. In this respect individuals vary, and the same individual varies at different times. The average increase in pulse due to smoking is ten beats.

Smoking can produce arrhythmia, an irregular stop and jump of the heart which often thoroughly frightens its owner. The pulse of an unborn baby is raised when the mother smokes. Habitual smokers have a 50 percent higher incidence of palpitation of the heart than non-smokers.

Smoking raises the blood pressure, markedly and quickly. The higher your blood pressure is, the more sharply does tobacco lift it. Apparently the blood pressure does not develop any tolerance for tobacco,

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as does the digestive system. Nevertheless, smoking does not *cause* permanent high blood pressure. When the smoking stops, the pressure falls slowly to normal.

Smoking constricts the blood vessels, especially those of the feet and hands. The smaller the blood vessel the tighter is it constricted, and often smoking closes the tiny vessels under the fingernails entirely. As soon as one starts a cigarette, the rate of blood flow in the hands decreases to less than half normal, and it stays down for about an hour.

The effect of this constriction is curious. The temperature of hands and feet drops. "Practically all the subjects who inhale show a definite drop in surface temperature at the fingertips," reported Drs. Irving Wright and Dean Moffat at New York Post Graduate Hospital. The drop averaged 5.3 degrees, was frequently more than ten degrees, and occasionally as much as 15.5.

Nicotine constricts the veins; alcohol dilates them. When we drink and smoke at the same time, we are in effect prodding ourselves with a pitchfork to get a lift and beating ourselves on the head with a club to offset it. Hence the popular belief that taking a highball offsets the effect of taking a cigarette. Drs. Roth and Sheard at Rochester, Minn., went into this interesting possibility, making 121 tests on 65 persons. The winner was nicotine; it was more potent than alcohol; "the constricting effects of smoking cannot be prevented by alcohol."

Buerger's disease — fortunately rather uncommon — is characterized by loss of circulation in hands and feet, sometimes so serious that gangrene may form and amputation be necessary. Doctors are cautious souls and do not say that smoking causes Buerger's disease. But in a study of 1000 sufferers from Buerger's disease 1000 turned out to be smokers; and of another 1400 cases checked at Mt. Sinai Hospital, New York, 1400 were smokers. A group of 100 cases were studied for more than ten years; in all of them the disease was arrested when smoking stopped. Dr. Irving Wright reports that in 100 consecutive cases amputation was avoided in 97 cases, but was necessary in three — the only three who would not stop smoking. Only a few isolated cases have ever been reported among non-smokers.

No more vivid and dismaying comment on the strength of habit could be imagined than the reaction of one Buerger's patient, who was told repeatedly that he must choose between smoking and progressive amputation of feet and hands. Some years later one of the doctors was hailed on the streets of Chicago by an armless, legless beggar on a little wheeled platform.

"Hey, Doc! Remember me? Say, be a good scout, light a cigarette for me and stick it in my mouth, will you?"

There is no proof that smoking causes heart disease. But there is evidence that heart disease is more prevalent among smokers than among

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non-smokers, and that smoking may intensify existing heart disease.

Doctors selected 1000 men over 40 who smoked and 1000 who did not smoke. Of the non-smokers under 50, one percent had coronary disease, of the smokers 4.8 percent. Of the non-smokers in age group 50-60, 2.6 percent had coronary disease, of the smokers 6.2 percent.

Virginia doctors, in an article on angina pectoris, point out that "coronary disease develops before the seventh decade significantly more often in smokers than in non-smokers."

It would be difficult to select a better-qualified group of heart specialists than Dr. Paul D. White of Boston, Dr. Robert Levy of New York, Dr. Edwin P. Maynard of Brooklyn and Dr. Samuel Levine of Harvard. In brief, these four men testify as follows:

Dr. White: "Tobacco causes no actual heart disease, but may produce irregular pulse, precipitate or aggravate the angina pectoris of coronary heart disease."

Dr. Levy: "Smoking does not increase significantly the work of the heart. The more important cardiac conditions for which smoking should be prohibited are congestive heart failure, acute stages of cardiac infarction, active rheumatic carditis, and peripheral vascular disorders [disorders of the blood supply of hands and feet]."

Dr. Maynard: "In certain individuals smoking is harmful to the heart. We do not know how to tell

which patient should smoke and which should not."

Dr. Levine: "In former years I used to tell patients with angina pectoris or coronary artery disease to smoke not more than two cigars or eight cigarettes a day. Now I am more inclined to urge them to omit smoking entirely."

What does all this add up to? The chief difference of opinion is as to *how much* damage smoking does to the heart. All doctors agree it can damage sick hearts. It is, in short, never a help and often a menace.

WILL CIGARETTES induce cancer? "For every expert who blames tobacco for the increase in cancer of the lung," says Dr. Charles S. Cameron, medical director of the American Cancer Society, "there is another who says that tobacco is not the cause." The ACS formally states that there is no answer generally accepted as scientifically valid. The question is being examined carefully; within a year there may be "sufficient data for publication."

This probably refers to the most extensive and reliable research yet made in this field, which is now being completed by Dr. Everts Graham and Ernest Wynder, one of his senior medical students at Washington University, St. Louis. Dr. Graham's studies will cover close to 2000 persons in St. Louis, New York, Chicago and Salt Lake City — the last because orthodox Mormons do not smoke and therefore offer an excellent control. It is expected to

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show that over 95 percent of patients with lung cancer smoke a pack of cigarettes a day or more, and have done so for many years.

"Will you be able to say clearly that smoking causes lung cancer?" I asked. Dr. Graham shook his head.

"No," he replied, "but we will say that it is curious how very few non-smokers develop lung cancer."

"Very few" is one half of one percent of the victims of this disease. This contrasts with the 95 percent who are steady smokers.

Cancer of the lung, Dr. Graham stresses, has shown a shocking increase in the last 35 years. "As a possible cause," he says, "we must look for some factor in our civilization which has shown a similar increase. We eliminated carbon monoxide after examining traffic policemen who breathe it in large quantities."

While all other types of cancer were declining in frequency, the age-adjusted death rate for respiratory cancer rose steadily from 3.7 per 100,000 in 1930 to three times that in 1947. In Georgia mortality from this cause rose from 23 per 100,000 to 200 in ten years. Dr. Alton Ochsner of the Ochsner Clinic in New Orleans says: "Twenty-five years ago I saw only one cancer of the lung in four years. In the last 15 years I have seen thousands. I am convinced that there is a definite relationship between smoking and cancer of the lung."

It is generally agreed that cancer of the mouth, tongue and lips is un-

duly prevalent among smokers. Researchers in Michigan, Illinois and Pennsylvania have come independently to the same conclusion: that the majority of victims of cancer of the tongue are excessive users of tobacco, that pipe smokers who develop lip cancer get it at the spot where the pipe has always rested, and that tobacco chewers, if they develop cancer, develop it at the place where the tobacco has been held.

CAN SMOKING shorten your life? Some ten years ago the late Dr. Raymond Pearl of Johns Hopkins studied the life span and smoking habits of 6813 white American males. His carefully tabulated statistics tell us that if you take 300 people at the age of 30 — 100 of them non-smokers, 100 light smokers and 100 heavy smokers —

Of the 100 non-smokers, 66 will reach 60 years;

Of the 100 light smokers, 61 will reach 60;

Of the 100 heavy smokers, 46 will reach 60.

"The conclusion is clear," said Pearl, "that smoking was statistically associated with impairment of life duration. The amount of impairment increased as the amount of smoking increased."*

Various doctors have quarreled

* Andrew Salter in his book, *Conditioned Reflex Therapy*, makes the following computations based on Dr. Pearl's figures: "The heavy smoker pays with 34.6 minutes of life for each cigarette he smokes. The pack-a-day smoker pays with 11.5 hours for each pack he smokes."

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with this—less with the figures themselves than with the conclusion that smoking had something to do with the death rate. Dr. Robert Feldt suggested that the men who smoked most were under heavy strain and worry, which caused them to smoke more, and was more likely to cause them to die early than was the smoking itself. The kind of people who smoke to excess, others have pointed out, are often temperamentally the kind of people who do other things to excess also.

If tobacco is so deadly, ask the doubters, why don't insurance companies consider this in their rates? Perhaps they will before long, for they have been thinking about it. Harry Dingman, in the book *Risk Appraisal*, published by the National Underwriter Company, says: "Use of tobacco entails extra mortality. In assessment of risk, why ignore it?" And a company medical director at an insurance meeting said, "We don't give standard insurance to excessive drinkers. I think we shouldn't give it to excessive smokers."

Higher mortality among smokers was noted in a study made by Dr. Robert A. Goodell of the Phoenix Mutual Life Insurance Company. This covered 5000 smokers and 5000 non-smokers.

"But honestly," added Dr. Goodell orally, "I couldn't say whether it was due to tobacco or perhaps because smokers sit up later at night. I did check these figures against the use of alcohol, and it wasn't that.

I firmly believe it was due to respiratory aggravation. There does seem to be a slightly increased mortality due to smoking."

To sum up, we can do no better than quote other figures in Mr. Dingman's insurance book: Habitual smokers have 62 percent higher incidence of gas on the stomach, 65 percent higher incidence of colds, 76 percent higher incidence of nervousness, 100 percent higher incidence of heartburn, 140 percent higher incidence of labored breathing after exertion, 167 percent higher incidence of nose and throat irritation, and 300 percent higher incidence of cough.

WHAT DOES it all come down to? Think over the many theoretical and actual kinds of damage which smoking causes. Discount them all you want. Then look in vain for any evidence of any measurable *good* effect. Then speculate with incredulity as to why we go right on smoking.

It may properly be regretted that anti-tobacco folk are as violent as they are in their statements. They damage their cause. Smoking is not the invention of the devil; it will not destroy your morals at all, nor your health probably. A moderate, reasoning person can with profit study the possible bad effects of smoking and reduce his habit to normal temperance. Extreme statements do not encourage him to moderation.

That there are pleasant effects, not subject to measurement, millions of smokers are quick to agree. Dr.

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E. J. Grace of Brooklyn says: "I know of no other substance in the entire realm of medicine which can so readily and promptly occupy all five senses and produce a true smoke screen against reality. Any habit which has power to produce a temporary exhilaration will probably persist until men and women are more adequately prepared mentally to cope with this complex civilization.

"The problem is infinitely more profound than is apparent. In spite of the well-known detrimental effects of smoking, the temporary solace from it obscures the tragic end results which come on insidiously over a period of many years."

Every day, of course, people stop smoking, and stay stopped. Given a good enough reason, almost every confirmed smoker will stop. The trouble is that the good reason usually only comes when (and because) it is too late for the smoker's health.

All this being so, why do not physicians warn their patients more helpfully about smoking? Because doctors are human, too, and many of them smoke; because many of them therefore hesitate to believe the worst about the friendly little cigarette; and, as one physician noted sadly,

AMONG NEARLY a hundred publications consulted by the author in the preparation of his article, the following may be noted:

The Journal of the American Medical Association, October 19, 1949, "Tobacco and Coronary Disease," John P. English, M.D.; March 11, 1939, "The Effect of Smoking on the Alimentary Tract," J. G. Schnedorf, M.D., and A. C. Ivy, M.D.; October 18, 1947, "The Effects of Smoking Cigarettes on the Heart," Robert L. Levy, M.D.; July 15, 1944, "The Effect of Smoking Cigarettes," Grace Roth, Ph.D.; May 18, 1946, "Smoking and Arteriosclerosis," Leonard Weinroth, M.D.

New York State Journal of Medicine, July 15, 1945, "Smoking and Tuberculosis," Herbert Schwartz, M.D.

The Military Surgeon, July 1944, "The Cigarette, the Soldier and the Physician," Major C. W. Crampton.

The Journal of the Indiana State Medical Association, June 1942, "Tobacco Intoxication," Byron Kilgore, M.D.

Gastroenterology, February 1947, "The Effect of Smoking on Malnutrition and Digestion," A. Koehler, M.D.

Journal of the National Education Association, February 1946, "Tobacco Causes Cancer of the Lung."

The Journal of Allergy, September 1938, "Tobacco Allergy and Thrombo-Angiitis Obliterans — Buerger's Disease," F. Howard Wescott, M.D., and Irving S. Wright, M.D.

Virginia Medical Monthly, September 1937, "Tobacco Heart," Harry Golston, M.D.

The Laryngoscope, February 1935, "Some Clinical Observations on the Influence of Certain Hygroscopic Agents in Cigarettes," Frederic B. Plinn, M.D.

Medical Times, November 1944, "Tobacco Smoke as a Carcinogenic Factor," Edwin Grace, M.D.

Cancer Research, April 1941, "The Production of Tumors by Tobacco Tars," Curtis Flory, M.D.

American Heart Journal, July 1947, "Tobacco Angina," J. Marion Bryant, M.D., and J. Edwin Wood, Jr., M.D.

The Story of Tobacco in America, Joseph C. Robert Knopf, 1949.

Tobacco and Health, Arthur H. Steinhaus and Florence Grunderman. Association Press (YMCA), 1948.

Heart Disease, Paul Dudley White, M.D. Macmillan, 1948 edition.

Your Heart, Metropolitan Life Insurance Company, 1946.

An Introduction to Gastroenterology, Walter C. Alvarez, M.D. Paul Hoeber.

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"because forbidding tobacco makes the doctor unpopular."

The physicians most concerned about the dangerous effects of smoking are those who have had greatest personal experience with research into those effects.

When I began research for this article, I was smoking 40 cigarettes a day. As I got into the subject, I found that number dropping. As I finish the article, I am smoking ten a day. I'd like to smoke more, but my investigation of the subject has convinced me that smoking is dangerous and, worse — stupid. Finally,

I enjoy my ten cigarettes ever so much more than I did the 40!

To me, it all adds up to this: Smoking is a very pleasant, very foolish habit. Most people can indulge in it with no apparent damage. Eight cigarettes a day, apparently, harm no normal person. No one should indulge in smoking as much as he wants to. Everyone should smoke less, if only for the reason that one enjoys it more.

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