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THE NOT SO SWEET
SIDE OF SUGAR

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SUMMARY

This is the upsetting story of how sugar has become the tobacco of the new millennium and how corporate powers attempted to shield the public from the fact that a simple pleasure eaten in excess can have dire consequences in our health. In the early 1900's diabetes was practically unknown and since then it is estimated that one in every seven to eight adults have the disease in our country today. Additionally obesity, dental problems, heart disease and cancer can be added to this list. This rapid rise in diabetes, in particular, can be linked to the spread of the western diet across the globe in the past 150 years. In the last 70 years corporate sugar has tried to convince the public that their product is not unhealthy. This paper traces the path of their deception and gives us good reasons to correct our diets and improve our health.

ABOUT THE AUTHOR

W. Ronald Helbron was born in San Bernardino CA. in 1938. At age 6 he moved to Redlands with his parents during World War II. He went through the Redlands School System graduating in 1956 from Redlands High School. In 1958 he graduated from San Bernardino Valley College and went on to receive his D.D.S. from U.S.C. School of Dentistry in 1963. He then joined the U.S. Army and became a Captain in the Army Dental Corp and was stationed in Stuttgart, Germany. After two years he fulfilled his military obligation and returned to California, practicing briefly in Orange County, and then returned to Redlands where he practiced for the next 48 years.

Ron is now retired and has been involved in a number of community organizations over the years. They include : Member of the Rotary Club of Redlands for over 53 years, past board member of The Friends of Prospect Park and the Kimberly Shirk Association, ten year board member of the Redlands Y.M.C.A. and President 1994-1996, Assistance League of Redlands volunteer dentist and past member of their Dental Advisory Committee.

Ron and his wife Nikki have been married for 55 years. They have 2 ,daughters and 9 grandchildren.

THE NOT SO SWEET SIDE OF SUGAR

The purpose of this paper is to bring to your attention some of the less known problems associated with sugar — both sucrose and high-fructose corn syrup. I have purposely left out discussing carbohydrates which turn to sugars also, meaning foods you wouldn't think as sugary - like potatoes, pasta and grains do eventually break down into simple sugars in the body. In my past dental practice I dealt with the many problems sugar caused to tooth and root structure. The most damaging consequence was the interaction between sugars and either of these oral microbes, *Streptococcus Mutans* or *Lactobacillus Acidophilus* which caused the production of destructive acids. But, as you will see, sugar is a principle cause of chronic diseases that have the potential to kill us or at least speed up our demise. My goal is to tell you how we got to the point where a third of all adults are obese, two thirds are overweight, almost one in seven is diabetic and recently cancer can be added to this list. However the prime suspect for this dietary influencer on these conditions, until recently, has been treated nothing more than a harmless pleasure.

Elliot Joslin was a medical student at Harvard in the summer of 1893 when he documented his first consultation with a young 26 year old diabetic patient at Massachusetts General Hospital. The patient was Mary Higgins, a young immigrant with a severe form of diabetes mellitus. Joslin's interest in diabetes dated to his under grad days at Yale, but Higgins case seemed to catalyzed his obsession. Over the next five years he and a renowned Harvard pathologist would comb through the hundreds of handwritten case notes of the Mass. General Hospital, looking for information that might shed light on the cause of the disease and how to treat it. Joslin made two trips to Germany and Austria to learn more from the most influential diabetes experts in the world at that time. In 1898, the same year Joslin established a private practice specializing in the treatment of diabetes, he and his pathologist friend presented their analysis of the Mass. General case notes to the annual meeting of the AMA in Denver. They had examined the record of every patient treated at the hospital since 1824. In those 74 years, a total 172 patients had been

diagnosed with diabetes. These patients represented only 0.3 percent of the patients being seen at the hospital, but they noted a clear trend in the increase of recent admissions. As many diabetics were admitted in the last 13 years as in the previous 61 years.

William Osler, often referred to as “the father of modern medicine”, also documented the rise of diabetes in his textbook, **The Principles and Practice of Medicine**. Osler joined the staff of Johns Hopkins Hospital in Baltimore in 1889, the year it opened. Osler later reported that, of the 35 thousand patients under treatment at the hospital in its first 8 years, only 10 had been diagnosed with diabetes. In the next 8 years 156 cases were diagnosed. An analysis of diabetes mortality statistics in 1924 reported a 400 % increase in some American cities since 1900 and almost 1,500% increase since the Civil War.

Despite all of this information, the disease remained rather rare in 1934. It was estimated that only 2 to 3 Americans in every thousand had diabetes. Since then things have certainly changed. In 2012 the Center for Disease Control or CDC estimated that one in every seven to eight adults in this country had the disease. That's 10 to 12% of our population. Another 30% are predicted to get diabetes sometime in their lives. Almost two million Americans were diagnosed with diabetes in 2012—one case every 15 to 16 seconds. Among U.S. military veterans, one in every four patients admitted to VA hospitals have diabetes. As of today the CDC says that over 100 million US adults are living with diabetes or pre-diabetes.

The prevalence of both diabetes and pre-diabetes was considered very small among the Alaskan Eskimo populations prior to 1960. Eight Eskimos were known have diabetes as reported in one article in the Journal of the American Medical Association in 1967. Soon after in the 1970s, a marked increase was noted in the increasing appearance of a pre-diabetic condition of glucose intolerance. Recently, diabetes rates in Eskimos was 9 percent - equal to the levels in the U.S. and Canada. American Indian populations showed the same increase over this same period from being virtually non-existent in the 1940's. Similar patterns of this sudden increase in diabetes was recorded in the Polynesians in the South Pacific, Aboriginal populations in Australia, the Maoris in New Zealand, and populations throughout the Middle East, Asia and Africa. The bottomline is that anywhere populations began eating Western diets and living Western lifestyles — diabetes followed. The question was what was

happening here? Public health authorities and clinicians rather rapidly came to the conclusion that this problem had to be caused by a dietary change and because diabetes was a disease of carbohydrate metabolism, the main culprit had to be SUGAR.

The industrial revolution contributed to the explosion of sugar consumption in the United States and the United Kingdom with the birth of confectionary, cereal, and soft-drink industries, and with the increasing availability of chocolate bars and ice-cream treats. It was with this speedy increase in sweets in our diets so did diabetes become such a threat to our health. When sugar and sugar rich products spread across the globe, so did diabetes. When peasant farmers throughout Africa, India, Asia, and Central and South America migrated to cities and towns to become wage earners they no longer were eating locally grown cereals, starches, and fruits, but instead they were buying cheap sugary drinks and sugar-laden treats in markets and shops. With these increases in sugar consumption comes the disastrous consequences to our health. People diagnosed with diabetes will die at greatly affected rates from stroke, heart disease, and kidney disease. It is now considered the cause of at least 40 percent of the cases of kidney failure and diabetic coma. If no treatment is given, and even if it is, the patient's eyesight will deteriorate, their teeth will decay, they'll get foot ulcers and gangrene, and they'll lose limbs to amputation. Six in every ten lower-limb amputations in adults is due to diabetes.

Even going back to the 1950's, the sugar industry was aware of the possibility of a very few negative remarks about sugar popping up in the media. It was then that Ancel Keys, a prominent physiologist at the University of Minnesota, first stated that fat— not sugar—causes the high cholesterol levels that lead to heart disease. What few people knew, however, is that Keys' research was funded by the sugar industry.

During the 1970s the sugar industry became quite aware of the negative blame that had been thrust upon them and began trying to convince the medical community that sugar was not entirely to blame for the increase in diabetes in the world. In 1973, Jean Myer of the Harvard School of Public Health, probably one of the most influential nutritionist of that era, suggested that sugar “probably plays an etiological role in those individuals who are genetically susceptible to the disease.” It was during

this time that researchers and clinicians debated on whether or not sugar played a role in diabetes development.

Gary Taubes, in his book **A Case Against Sugar**, details how the sugar industry's pattern of influence speeded up in the 1960s and '70s as they funneled money to scientists and public health officials to combat the notion that sugar was a unique cause of obesity and chronic illness. One of those recipients was Fred Stare, whose work as founder and chairman of the Department of Nutrition at the Harvard School of Public Health was supported financially for decades by the sugar purveyors like General Foods. The most public defender of sugar, Stare repeatedly asserted, even as late as 1985, that "it is not remotely true that modern sugar consumption contributes to poor health."

But by the late 1970s, sugar had almost vanished from the discussions of most professionals. Dietary fat had been implicated in the cause of heart disease. It was added weight of the individual that was the main cause of heart disease and diabetes, not sugar.

In 1999 it was estimated that the per person sugar consumption in the U.S. was 153 pounds per year. (This is what the Department of Agriculture refers to as per capita consumption numbers). In the early twenty first century, because of pressure by the very influential Sugar Lobby, these numbers were cut in half to an unreliable number of 67 lbs. of sucrose and HFCS per person per year which is certainly highly debatable. The latest 2018 data from the FDA reports an increase from 67 lbs. to 170 pounds per person, which is certainly not an improvement. It must be understood that when I mention sugar I am referring to sucrose and high fructose corn syrup or HFCS.

It has been said that sugar can be compared to a drugs or alcohol, but without the side effects. Its reaction with babies first taste is generally always positive for them. It has almost intoxicating properties to most of us without many initial side effects. Imagine a drug that can intoxicate us and infuse us with energy and a feeling of pleasure. It doesn't have to be smoked, injected or snorted to give us a soothing effect. Sugar can be mixed with almost any food or drink and give us a profound and intense pleasure, so profound that it's use has become a driving force in many of our lives. Overconsumption of sugar probably has many long-term side

effects, but there are none in the short term—no slurred speech, staggering gait or dizziness, no passing out or heart palpitations. On being given to children it initially makes them happy but then later on can make them hyper and being irritated and nervous as the “sugar high” wears off. Another downside is that children will start to expect another dose and then demand it regularly.

Another reason sugar is so prominent is that it is cheap, but it was not centuries ago. As the price of a pound of sugar dropped over the centuries — from the equivalent of 360 eggs per pound in the thirteenth century to two in the early twentieth. In the 1930’s during the Great Depression sales of candy soared as prices decreased. In an article in the New York Times at this time said, “The Depression proved that people wanted candy, and that as long as they had any money at all they would buy it”.

In his book, ***Sweetness and Power***, Sidney Mintz wrote in 1985 that sugar is one of a handful of “drug foods” that came from the tropics, and on which European empires were built from the sixteenth century onward. The others were tea, coffee, chocolate, rum, and tobacco. Rum is, as you know, distilled from sugarcane, while tea, coffee, and chocolate were not consumed with sweeteners in their regions of origin. However in the seventeenth century, when sugar was added, consumption of these exploded.

It is well known that Coca-Cola original recipe was a mixture of caffeine and cocaine, then sugar was added to eliminate the bitterness of the first two ingredients. At the beginning of the twentieth century cocaine was removed from the product which made little difference in sales. Coca-Cola in what one author said in 1938 was “the single most widely distributed product on the planet and the second-most recognize word in the world, okay being the first.”

Another interesting connection with sugar that definitely does not involve our diet, but absolutely affects our health is tobacco. Sugar is a critical ingredient in the American blended-tobacco cigarette. R. J. Reynolds’ Camel was introduced in 1913. The marriage of tobacco and sugar gave the “mild” experience of smoking cigarettes compared to cigars. A 1950 promotion described this blending as making it more enjoyable to inhale deeper into your lungs. What they left out was that

this action would lead to the addictive nature of smoking and the carcinogenic results that would follow in many individuals.

American blended cigarettes, as the name implies, are blends of multiple types of tobacco. The two most prominent tobaccos are air-cured Kentucky “Burley” tobacco and flu dried Virginia tobacco. This flu curing technology in the 1860’s made inhalation possible. It has been said that this invention may well have been the deadliest invention in the history of modern manufacturing. Gunpowder and nuclear weapons have killed fewer people.

When Virginia tobacco is flu-cured, the harvested tobacco leaves are placed over iron flues that heat the air to progressive higher temperatures. The process continues for about a week, during which the heat first fixes the color of the leaves and then dries them, while breaking down the enzymes in the leaves that would otherwise break down the sugars they contain. Tobacco that begins with a relative high carbohydrate content (up to 50 percent of dry weight) but is low in sugar (3 per cent) ends up with as much as 22 percent sucrose. Since the enzyme that would normally breakdown sugar in the leaves has been destroyed by flu curing, the remaining tobacco has much more sugar. This conversion of starch to sugar is comparable to what happens to bananas that are harvested green and are allowed to ripen.

The higher sugar content of the flu-cured tobacco leaves, as previously mentioned, is the key to inhalation of cigarettes. The high sugar content results in tobacco smoke that is acidic rather than alkaline. Alkaline smoke irritates the mucous membranes and stimulates a coughing response. Acidic smoke can be inhaled without doing either. It is of interest that both pipe and cigar tobacco is not treated with flu-curing and therefore not inhaled as easily.

Air curing Burley tobacco results in tobacco that is rather rich in nicotine, the component that results in addiction. The leaves of this tobacco are porous and absorbent, a quality that cigarette manufactures used to flavor their product with sugar. Burley tobacco can absorb up to 50% of its weight in sugar in the saucing process. In the year 1929 tobacco growers were saucing Burley tobacco with fifty million pounds of sugar a year. This sugar balanced out the tobacco’s naturally alkaline smoke, increasing its inhalation ability and maximizes the delivery of

nicotine. Another plus for them was the cost saving, because sugar is much cheaper than tobacco and therefore less tobacco could be used.

Sugar craving seems to be hard-wired into our brains. Children seem to respond to it instantaneously, from birth on. If you give babies a choice of sugar water or plain, they will readily suck down the sweet one, and make faces at the other. Nor will they be pleased with cow's milk unless it has a little sugar added to it to bring it up to the sweetness of breast milk. Today sugar has become almost unavoidable in our consumption of preprocessed foods. With some effort of reading ingredient labeling of packages and cans can we find it's amount. Of course there are the obvious sweet foods— candy bars, cookies, ice cream sodas, breakfast cereals — but also the less obvious canned soups, salad dressing, luncheon meats, bacon, chips, pretzels, canned tomatoes and breads have significant levels of sugar in them.

One of the most damaging campaigns promoted by companies in the cereal business to influence youngster's parents to purchase their products occurred in the 1950s. The dried-cereal industry had it's roots in Battle Creek, Michigan, along with the health-food movement in the late 19th century. The pioneers were John Harvey Kellogg, a physician who was a follower of the Seventh-day Adventist Church, and his former patient, C. W. Post. Both men operated what they called "sanatoriums" for the well healed. (Kellogg's many famous patients included J.C.Penny, Montgomery Ward, John D. Rockefeller, and Eleanor Roosevelt). Both men believed that the path to health and happiness was in what you ate. The idea of a breakfast cereal flake that would aid digestion came to him in a dream one night. He set to work on his idea the next morning. Unfortunately, Post had beat him to it and by 1900 Grape Nuts had made him then the single largest legitimate fortune in the United States.

Post Grape Nuts were originally with no cane or beet sugar, but with maltose from barley flour. Kellogg's first corn-flakes were sugar-free as well. In 1902, J.H went on a trip to Europe and put his younger brother W.K. in charge. While J.H Kellogg was away, the younger brother added sugar to improve the taste and flaking process. When he returned, John Harvey was outraged because he felt that sugar was unhealthy. But, the consumers disagreed with the senior Kellogg and a very small amount of sugar stayed. Two years later Quaker Oats gave away a truly-sugar coated cereal at the 1904 Worlds Fair in St. Louis, the company

considered it candy, as did their customers, and chose not to market it, and the company came to the conclusion that “America’s sweet tooth was just a fad”. How wrong they were.

For the next 35 years the cereal industry stayed fairly healthy, but during this period more sweetening agents were slowly added to their products which developed into breakfast candy. This process began with a cereal industry outsider— Jim Rex, a heating equipment salesman. Jim was sitting at the breakfast table with his children watching them add more and more sugar to their puffed-wheat cereal. It was then that he got the idea of how to get them to stop continually dipping their spoons into the sugar bowl. Why not create a cereal with the sugar already added?. The result was Ranger Joe, the first sugar-coated, pre-sweetened cereal sold in America. After a few months of trial and error problems with production he sold the company to Nabisco known then as The National Biscuit Company. But by then, Post Cereals were already rolling out a competitor, Sugar Crisp, nationwide. Kellogg’s failed to produce a sugar coated cereal and turned to chocolate instead. The company logic was that, “all this sugar is not the best for children, and the bittersweet chocolate was good for them and would not be harmful to them.” The result was Coco Krispies. When the new cereal was first introduced the bittersweet flavor was a flop, so the company added more sugar to it and the sales took off. One Kellogg salesman said, “it was a dietary flop, and a sales bonanza”.

From the 1950’s thru the 60’s the cereal industry introduced dozens of sugar-coated cereals, some with one half their calories derived from sugar. The greatest advertising minds in the country would create animal characters to entice children to talk their parents into buying sweet cereals — Tony the Tiger, Mr. Magoo, Yogi Bear, the Flintstones, Rocky and Bullwinkle would take up Saturday morning television promoting cereal candy. The cereal companies would spend over six million dollars a single year in the late 60’s promoting their products.

By the end of the 1960’s the public was beginning to realize the dangers in using sugar, but did not want to give it up. Artificial sweeteners were becoming more and more popular. It was also about this time that sugar industry executives became concerned about the threat to their livelihood from the use of artificial sweeteners. Saccharin, discovered in 1897 is a derivative of coal-tar. At more than 500 times sweeter than

sugar and it could be made for one-tenth the cost of sugar. The industry made a direct attack against both saccharin and cyclamates, leading the FDA to band cyclamates as a possible cancer causer. This tended to taint all artificial sugars.

As a dental side note to one artificial sugar, Xylitol is a low-calorie sweetener obtained from a variety of trees and plants, but is most commonly manufactured from the birch tree. It has the look and feel of table sugar and is just as sweet, but contains 40% fewer calories compared to sugar. Xylitol gum, most commonly found in Trident original flavor, is said to promote improved dental health by neutralizing plaque acidity on teeth and repairing tooth enamel.

In the mid-1970s the sugar-industry hired researchers as consultants. These consultants said we need to do what ever experiments and clinical tests needed, at no limit to the cost, to make certain whether or not sugar causes diabetes, heart disease or anything else. Instead of doing this the leaders of the sugar industry launched its public relations campaign to defend sugar and attack its critics. Because this campaign was so successful, the research necessary to see if there were any dire consequences of sugar was put on hold for at least 20 years. As I mentioned before, the industry's campaign could only succeed with the help of the nutrition community that had come to the belief that dietary fat, saturated fat in particular, was the most likely cause of our chronic diseases

Since the 1990s researchers have determined that if you feed animals enough pure fructose or enough pure sugar their livers will convert much of the fructose to saturated fat, which is the one that gives us heart disease when we eat it, by raising our bad LDL cholesterol. This same thing supposedly happens in human beings. This fat accumulation in the liver accompanies insulin resistance, which if allowed to progress will result in diabetes. This can be documented in animal studies but can not be verified ethically in human ones because it could result in diabetes and coronary heart problems in the participants. New research also has recently shown that drinking sugary drinks can increase your blood pressure and that sugar has a bigger impact on increasing blood pressure than salt. High blood pressure certainly contributes to heart disease.

An article in the New England Journal of Medicine in August of 2016 stated that thirteen different cancers were associated with being

overweight or obese. These cancers were some of the most well known and common of all : colon, thyroid, ovarian, uterine, pancreatic, and (in post menopausal women) breast cancer. Unfortunately, it seems we are losing the war on cancer, but we are losing it to what we eat and drink. These statistics confirm this — The Center for Disease Control in 2014 stated that approximately 631,000 Americans were diagnosed with body fat related cancer, which accounted for 40% of all cancers that year. It is very difficult to come to a conclusion of which foods in our diet are causing this alarming statistic, because putting a study together is almost impossible to do. This is, of course, because a cancer typically arises over a number of years before it is detected. Trying to figure out what one group of individuals is eating, that maybe causing a cancer to develop, has been extremely difficult to determine.

Recently researchers have made progress in understanding the diet-cancer connection. This advancement has emerged in a field called cancer metabolism, that only a few really understand. This field of study investigates how cancer cells turn the nutrients we eat into fuel and building blocks for new cancer cells. Researchers have come to appreciate that some of the most well-known cancer-causing genes, long feared for their role in allowing cancer cells to proliferate without restraint, have another even more fundamental role: allowing cancer cells to “eat” without restraint. This research may lead to amazing cancer therapy, but in the meantime it may give us something even more important— the knowledge about how to prevent the disease in the first place.

One of those at the forefront of the cancer metabolism revival is Lewis Cantley. He has an explanation for the obesity cancer connection. Both conditions are also linked to elevated levels of hormone insulin. His research has shown how insulin drives cells to grow and take up glucose by activating a series of genes. This is a pathway that has been implicated in human cancers. The problem isn't the presence of insulin in our blood. We all need insulin to live. But when insulin rises to abnormally high levels and remains high (a condition known as insulin resistance, which is common in obesity), it can promote the growth of tumors. Too much insulin in our blood stream and many of our tissues are bombarded with more growth signals and more fuel than they would ever see under normal metabolic conditions. And because elevated insulin directs our bodies to store fat, this can also be linked to the various ways the fat tissue itself is thought to contribute to cancer. Before I go any farther let me explain the

term insulin resistance. This occurs when the body's ability to process glucose becomes impaired. Glucose enters the body when food is eaten. Normally, the pancreas will excrete insulin, which helps the glucose move out of the blood and into the cells where the body can use it for energy. Impaired glucose tolerance happens when the pancreas either does not release enough insulin or the cells become resistant to the insulin. As we age our body processes become slower or diminished. The pancreas is no exception. When a person is overweight the cells in the body become less sensitive to the insulin. There is some evidence that fat cells are more resistant to insulin than muscle cells. The result is that the pancreas produces more insulin. The overproduction of insulin can cause the pancreas to get tired and then reduce its ability to function.

The bottom-line is there is an obvious conclusion one must make to all of this. The danger is not simply eating too much, as commonly thought, but rather eating too much of the particular foods that increase our levels of insulin, such as easily digestible carbohydrates in general and SUGAR in particular.

This is not to say that all cancers are caused by too much insulin or that we should never eat sugar again. Michael Pollak, a metabolism researcher at McGill University in Canada, says that the best approach to sugar is to treat it like a spice — something that you occasionally sprinkle on foods, as opposed to an ingredient in nearly every meal and too many drinks.

Our problem as citizens is that recently an effort to put limits on sugar consumption in California has been jeopardized. Both the California Dental and Medical Associations had proposed a 2020 ballot measure that would tax sodas sold in the state. The multibillion-dollar soda industry responded with a threat of proposing a ballot measure that would jeopardize the fiscal outlook of local governments by requiring all cities and counties to achieve a two-thirds vote instead of the current 50% vote to raise taxes. Because of the good possibility of this passing, Governor Jerry Brown signed legislation enacting a twelve year tax moratorium on any local sugar tax. This does not effect California communities, such as San Francisco, Berkeley, and Oakland, that have already imposed sugar-sweetened beverage taxes. A recent report from UC Berkeley said that that city's soda tax resulted in a more than 50% decline in consumption of sugary beverages.

The 2020 ballot initiative by the CDA and CMA would have implemented a statewide tax of 2 cents per fluid ounce on sugar-sweetened drinks, providing at least \$1.7 billion in revenue for critical programs and constitutionally preserving the ability of California's local communities to make their own decisions regarding future soda taxes. Although I think there is growing support by a certain segment of our population that would support this sugar tax. This last incident of bullying by billion-dollar soda industry that put corporate profits ahead of public health is just another example of Big Sugar's strong-arm approach to protect their turf. I don't want to be too hard on Corporate Sugar, because just recently I observed a Coca Cola commercial on television admitting that they are trying to reduce the amount of sugar in their products because of public pressure. This at least is certainly a good move on their part. Just last month, on February 25 & 26th, two articles in the Los Angeles Times mentioned a new package of proposed bills in the California Legislature that would target obesity as a public health crisis. One of these proposals would ban restaurants and stores from selling 14 oz. Big Gulp-style sodas. It will be very interesting to see how the sugar industry will respond this time.

After completing this paper it is certainly obvious to me that the public needs to be aware of the dangers of sugar to all of us. Personally, I have seen the destructive forces of sugar in my younger years. But as I look back I definitely consumed too much sugar as a child. By the time I enrolled in dental school my decay index was rated in the extreme category because almost every tooth in my mouth had a restoration. I think my dental problems were a combination of high sugar and carbohydrate consumption, aggressive oral bacteria and poor dental hygiene. When I corrected most of these problems my decay rate came to a halt. Cutting back on sugar consumption can prevent much more serious medical problems than dental decay. I feel that all of us can benefit from monitoring our sugar intake. It could be as easy as reading the nutrition facts on that box of cereal or jar of pasta sauce and selecting an alternant with less sugar or eliminating those easily accessible sweets in our homes. One can certainly attempt to improve our diets by eating more vegetables, lean meats, fish and smaller portions of carbohydrates. Combine this with a regular exercise program that starts off by maybe just walking around the block. You will gradually feel much better and hopefully extend your life.

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KEY WORDS

Diabetes

Cancer Metabolism

Insulin

Insulin Resistance

HFCS - High Fructose Corn Syrup

FDA - Federal Drug Administration

