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How Sugar Affects the Body from Head to Toe

Amy Crosier
acrosier@murraystate.edu

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Amy C. Crosier

Murray State University

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Abstract

The overall health of Americans has drastically changed over the past two decades. Americans over the past decades have been faced with more healthcare related issues such as heart conditions, obesity, diabetes and dental caries. These conditions are a huge weight on the insurance companies and also the Americans that are affect by the medical conditions. We have now entered into a new era of convenience and instant gratification which has led to a world of health related problems. Sugar and processed foods are among the top leaders of health related problems.

Looking at what the average American takes in through the mouth is a good indicator of what one's health may look like. I have spent twenty plus years in the dental world and I am still in shock at all of the dental caries that Americans still have. Even with all of the educational material that is provided dental caries still remain high and most of that is because of the foods that the patients are eating.

Americans are also having more issues with heart disease than we have before. Mostly in part of the processed foods and lack of exercise. The main reason is the fact that everyone's glued to their cell phone or the television and for the most part lead a sedative lifestyle. Diabetes cases have also grown over the past years. In the United States we have more kids than ever diagnosed with juvenile diabetes. This also goes hand in hand with the lack of exercise and the amount of processed drive thru food that is being digested by the youth of our nation.

My overall goal is to show the cost of healthcare when sugar is introduced to the body in several different forms, for example, sodas and processes foods.

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Sugar cookies, brownies, bread, protein bars, sodas oh my how sweet these treats are to eat. Sugar tastes so good that we actually forget that it is basically a form of a drug. Ingesting too much sugar as we know can lead to the expansion of our waistlines but sugar also wreaks havoc on so many parts of the human body.

Sugars

Sugar is defined as a sweet crystalline substance obtained from various plants such as sugar cane and sugar beet, consisting mostly of sucrose, and is used as a sweetener for foods and drinks (Merriam-Webster n.d. Retrieved 1-28-19). Sugar is also defined by the scientific sector as an essential structural component of living cells and a source of energy in many organisms (Sugar-Wikipedia n.d. Retrieved 1-28-20).

Figure 1 Different Refined Sugar Levels

There are many types of sugars and to fully understand each type they are classified based on the number of monomeric units present. The word sugar is the generic term for disaccharides and monosaccharides (Customers. 2014, May 12, Retrieved 1-28-20).

Disaccharides are carbohydrates that are made up of two monosaccharides, such as lactose, maltose, and sucrose. Sucrose is also known as table sugar that falls into the disaccharide group and consists of glucose and fructose. Once glucose and fructose are combined the main use is to act as a sweetener in soda and other drinkable beverages along with

cakes, cookies, and other sweet treats. Disaccharides are responsible for breaking down the complex sugars like lactose into sugars such as glucose. The body needs these sugars broke down so the intestines can absorb the nutrients that are needed (Customers. 2014, May 12, retrieved 1-28-20).

Monosaccharides also known as simple sugar which is the simplest form of sugar as well as the most basic units of carbohydrates. Monosaccharides are also made up of fructose, glucose, and galactose. Fructose is also referred to as fruit sugar which is the sweetest of all the sugars and can be found in sugar cane, honey, and of course fruits. The most common form of simple sugar in the body is glucose and it is vital for cellular respiration. Although galactose is a simple sugar it is usually bound to another molecule (Background on Carbohydrates & Sugars. n.d. Retrieved 1-28-20).

There is also another group of sugars known as dietary sugars that are derived from plants, mainly sugar beets and sugarcane. Some of the dietary sugars in fruit come from apples, bananas, grapes peaches, strawberries, and many other fruits. There are vegetables that also contain dietary sugars for example sugarcane, sugar beets, carrots, yams, and sweet potatoes.

Most Americans are aware of the commercialized sugars that are mostly from sucrose. Brown sugar is almost ninety seven percent carbohydrates. Brown sugar has a richer flavor that the usual white sugar since it contains molasses and has two colors light brown or dark brown. On the other hand white sugar is ninety nine percent carbohydrates and is referred to as the common table sugar that is used as a sweetener in many homes.

Over the years artificial sweeteners such as equal, Sweet 'n Low, Splenda, and Truvia have come into play as a substitute for sugar. Most of the artificial sweeteners are derived from a form of synthetic polysaccharide maltodextrin and a blend of other sweeteners. Maltodextrin is mainly used in foods and drinks as a thicker and sweetener. Since maltodextrin is deemed safe for consumption, inexpensive, and water soluble it is added to many products such as infant formula, ice cream, salad dressing, peanut butter, and beer of all things. While maltodextrin may not be as sweet as regular table sugar it carries the same or more in calorie content. Diabetics and people with obesity issues should always be aware that maltodextrin can be in some foods they may ingest, so label reading is very important with health issues as these (Maltodextrin. n.d. Retrieved 1-28-20).

Figure 2 Artificial Sweeteners

Carbohydrates are a macronutrient that includes starches and sugar. The human body uses carbohydrates as its primary source for energy. Actually the glucose that is found in the carbohydrate digestion is a main source for the central nervous system to function properly. Almost all of the food that humans consume contains carbohydrates, but knowing the right carbohydrates is the key to healthy eating. There are also two types of carbohydrates the good carbs and the bad carbs. Both the good carbohydrates and the bad carbohydrates turn into sugar, but the difference is how fast the body can digest the carbohydrates and turn them into nutritional value. An example of a good carbohydrate is oatmeal. Oatmeal is full of fiber which takes the

body longer to break down, with the slow break down process blood sugar levels will remain stabilized and the body will feel full longer. On the flip side examples of a bad carbohydrates are table sugar, simple sugar, brown sugar and processed food. These sugars are processes very quick which causes the body to have raised blood sugar levels are well as inflammation of the body. In today's society it is so easy to over consume the simple carbohydrates (Team, V. 2019, December 9).

Figure 3 Bad Carbohydrates

History of Sugar

So where did all of the sugar come from? Sugar dates back to 8,000 BCE in the land of New Guinea where it was chewed and consumed raw. Between 8,000 BCE through 600 CE the farming of sugarcane spread across Southeast Asia, China, and India. Trading of sugar began on the open seas as sugar was heavily traded among the sailors. During the time frame of 100 CE crystallized sugar was used as a medical tool to help Roman and Greek cultures fight indigestion and stomach issues. India received their first interaction with crystallized sugar in 350 CE under the Gupta dynasty. During the time frame of 640 CE China joined in on cultivating sugarcane partly due to the technology that India had provided.

In 1096 CE the name sweet salt was given to sugar by the Crusaders who had returned back to Europe for the Holy Land. The main problem with sugar production in the 1200's was the fact that growing the sugar cane was highly labor intensive work, not only for the production but the processing as well. The bulks of raw sugar cane were very heavy which made the cost of

land transportation very costly. Most of the sugar at this time was coming from Cyprus where most of the natives were busy tending to their own food gardens and did not want to work in the hard labor intensive fields. The sugar estate owners then turned to the Black Sea region where they bought slave to do most of the work. Due the advancement in sugar presses in 1390 the amount of sweet juice being extracted from the sugar cane doubled. In the mid to late 1400's Madeira was making vast steps forward in the cultivation and refinement of sugar which lead to seventy ships trading sugar.

Over the next hundred years 1540 to 1658 roughly five thousand eight hundred sugar mills were built from the Santa Catarina Island to Brazil then on towards to the Caribbean and South America. The Dutch were the first to give South America and the Caribbean the first taste of sweetness. During the 1700's sugar became a sought out item as a European import. In the mid 1700's a chemist from Germany found sugar in the beet roots and during this same time frame Louisiana had their chance at tasting the sweetness of sugar. Jamaica was also making headway in the production of sugar by building the first steam-powered sugar mill.

Technology was pushing full steam ahead in the 1800's as Poland built the first sugar beet processing plant while British chemist Edward Charles Howard invented a method of refining the sugar. In 1813 the Howard vacuum pan hit the scene with the ability to boil the sugar cane juice in a closed kettle which was heated by steam and was partially vacuumed. With Howard's invention this lead to higher yields of sugar and lower production costs. In 1852 the first centrifugal machine was born allowing the sugar to be separated from molasses. By the end of the 1800's central California rolled out their successful crops of sugar beet, then soon after

factories were built to produce the production of the sugar beet. Fast forward to the 1900's where advancements in technology with the have made harvesting much easier due to tractor and combines. Technology has also increased the amount of sugar produced which with less time involved.

During the years of 2016 and 2018 the United States alone produced 8.5 million metric tons of sugar. In 2016 the global amount of sugar produced was an amazing 177 million tons. Florida and Louisiana are top producers of sugar in the United States. From the years of 2010 to 2019 Florida produced 150,000 tons of sugar while Louisiana harvested roughly 130,000 tons of sugar. Kentucky is not a sugar producing state but, is known for making sweet sorghum syrup (History of Sugar. n.d., Retrieved 1-26-20).

The typical American takes in a daily average of seventeen teaspoons a day which equals to two hundred and seventy calories a day, the recommended amount of sugar per day is twelve teaspoons which will equal to two hundred calories. Sugar can also be disguised as corn syrup, agave nectar, palm sugar, cane juice, and last but not least good old sucrose. With all of the different code names for sugar it can be complicated when reading labels if one is not familiar with all of the additives.

Figure 4 Simple Table Sugar

Effect of Sugar on the Body

The human body is a magnificent piece of science which is a physical substance of the human composed of living cells and extracellular materials and organized into tissues, organs,

and systems. The body needs proteins, carbohydrates, fats, vitamins, and minerals to grow and preform properly. Carbohydrates are one of the basic macronutrients needed by the body to sustain life. Looking at the body from head to toe and seeing the effect of sugar on different parts of the body is very eye opening.

Starting with the brain which is the most complex organ in our body and is composed of neurons and nerve cells. Out of all of the organs the brain requires more energy than any other organ, using one-half of all of the sugar that is consumed in the body. The brain is responsible for our thinking, learning, and memory which is associated with glucose levels and how the brain adequately process the glucose into a source of fuel. If the brain does not receive enough glucose then complications such as diabetes can occur and promote loss of energy for the brain as well as having poor attention spans and cognitive function. Even though the brain needs glucose for energy too much energy can spiral into a negative effect (Sugar and the Brain. n.d., Retrieved 2-5-20).

Figure 5 Human Brain

Too much glucose and other sugars can lead to diabetes, which occurs when the glucose levels are too high and stay high over a long period of time. The most common forms of diabetes are Type 1 and Type 2. Type 1 diabetes is where the immune systems gangs up on the pancreas and destroys the cells that produce insulin, which the body needs to help keep the glucose in check and running properly. Type 2 diabetes is caused by an individual's diet or even

the environment. The insulin will invade the cells and saturate them until they will no longer respond which in turn makes the cells insulin resistant. Long term effects on the brain and neurons can also be connected to Type 1 and Type 2 diabetes. When glucose levels become too high the brains functional connectivity which is also connected to the functional properties and brain matter become disoriented, this issues can lead to shrinking of the brain and even brain atrophy. The small vessels in the brain can also be affected due to the loss of blood flowing through the brain which can bring on cognitive difficulties. If the vessels are damages badly then vascular dementia can occur. Type 2 diabetes has also been linked to speeding up the brains aging process.

Moving past the brain and peeking into the eyes, as sugar can also affect eyesight. Typically people do not associate sugar with eye issues, but here is the reality of sugar on the eye. If the blood sugar levels are too high in the body the eye lens can swell and cause blurred vision. In order to correct the blurred vision the blood sugar levels must be brought back down to a normal range. If the blood sugars levels continue to remain high then this can lead to retinal vascular problems which can cause the blood vessels in the eyes to start hemorrhaging. If the eyes are left untreated for a long period of time then blindness can occur. The ophthalmologist or optometrist can see onsets of early diabetes in the eyes, so regular eye exams are recommended (Hughes, L. 2019, December 17, retrieved 1-29-20).

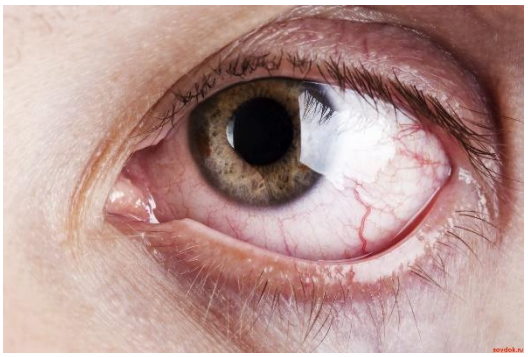


Figure 6 Human Eyes

Touching on the face, sugar also affects the youthful glow of the face. Most people think that over exposure to the sun and smoking are the main reason for premature aging of wrinkles, but sugar takes a toll on the production of collagen and elastin. Collagen and elastin are fibers that help support the structure of the skin. Collagen keeps the skin firm while the elastin keeps the skin tight. Here are some a few signs to look for; surface of the skin can be hard and shiny, discoloration, deep crevices, lines can also occur across the lip line, and sagging throughout the jowls (Hughes, L. 2019, December 17, retrieved 1-29-20).

Figure 7 Panoramic X-ray

Underneath the facial skin and muscles is the home of the teeth. A tooth is made up with four different tissue types, the pulp, dentin, enamel, and cementum. Teeth play a major role in the in the health of the body through digestion as they break down plants, meats, and other foods. One substance that the teeth cannot break down is sugar. When sugar is consumed through the mouth it begins to interact with the bacteria currently in the mouth. Bacteria and plaque use sugar as energy which create acid as a waste product, and slowly over time begin to eat away at the enamel of the teeth. Sugars are found in almost all foods and is the main factor for the decline in good oral hygiene.

Tooth decay is something that everyone is at risk for, but infants and adolescents are the most vulnerable. Dental caries or cavities are the most common chronic childhood disease

worldwide and the main reason children loose teeth at an early age. Baby bottle decay is the main reason that children between the ages of three months to three years' experience dental caries and missing teeth. Most parents are unaware that the formula contains sugar that is used as a source of nutrition and carbohydrates. After an infant has consumed a bottle of formula the gums need to be gently wiped down, one to help get the infant use to your finger being in their mouth and second infant teeth usually start poking through the gums between the ages of three months to six months.

Figure 8 Baby Bottle Decay

Once the new teeth have begun to populate the mouth they need to be gently cleaned with a warm baby cloth or rag. If the infant is given a bottle in the bed during nap time and regular evening bedtimes this can cause dental problems. A child should never be put to bed with a bottle that contains formula, breastmilk, juice, tea, or soda all of these items contain sugar. If the infant does need a bottle to go to sleep with then the bottle should only contain water. The sugar will sit on the baby's teeth which ends up turning into a liquid acid. The acid that has been created then sets out to destroy the outer coating of the teeth which is also known as the enamel. The enamel of a child's tooth is not near a strong as the enamel of a permanent adult tooth. In most baby bottle cases the front four teeth are the ones affected first, that is due to these teeth being some of the first teeth to come in and come into contact with the formula, breastmilk, or other sugary substances in the bottle. If the child takes the bottle to bed

on a daily basis then eventually the back molars will be subjected to dental carries as well (Tungare, S. 2019, November 7, Baby Bottle Syndrome. Retrieved 2-6-20).

When a child experiences tooth decay they also experience pain and infection, most of the time the parents are unaware that the teeth are causing the pain to the child. When the child is not asleep then the saliva is used as a source to wash away the sugars. Once the child has outgrown the bottle they still need help with brushing as their dexterity to reach all angles of the mouth has not fully developed and the teeth are still very vulnerable to decay (Hirsch, L. (Ed.). 2018, October). Mouth and Teeth (for Parents) - Nemours KidsHealth. Retrieved 2-6-20).

Heart health is a big topic today as the heart is what keeps the human body going. The heart is an organ that pumps blood thought out the body through the circulatory system, supplying oxygen and nutrients to the tissue and removing carbon dioxide and other waste (Human Heart: Anatomy, Function & Facts. n.d., Retrieved 2-13-19). In a study that was released in 2014 by JAMA Internal Medicine found that there is a correlation between a high sugar diet and a greater risk of dying from heart disease. The study was conducted over a fifteen year time frame and showed that individuals who received seventeen to twenty one percent of their calories from added sugar have a thirty eight percent greater risk of dying from cardiovascular disease than individuals who received eight percent of their calories from added sugars.

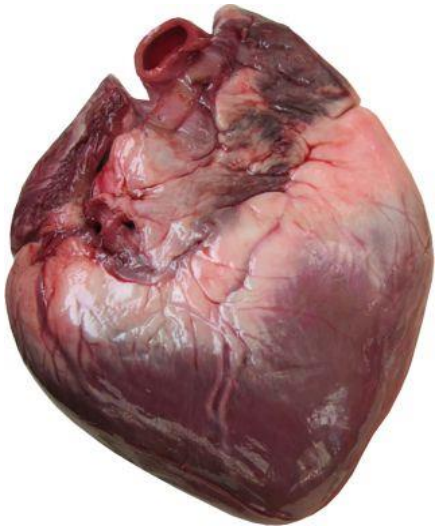


Figure 9 Healthy Heart

When sugar is overused and enters the body in large amounts over a period of time this causes the blood sugar levels are affected. Sugar when overconsumed produces extra insulin,

when extra insulin is produced it enters into the bloodstream that in turn can affect the arteries. When the artery walls become affect by the sugar they become inflamed which makes the walls grow thicker than they usually would, once the walls become thicker they also become stiffer. The inflammation, thickening of the walls, and stiffness all lead to the heart becoming stressed, when the heart is stressed then damage begins to start. The damage will start slowly and can eventually lead to heart failure, heart disease, heart attacks and even strokes.

Reducing the amount of sugar that is consumed can help to lower the blood pressure and take some of the inflammation off of the artery walls. (Harvard Health Publishing. n.d., the sweet danger of sugar. Retrieved 2-13-20). According to the American Heart Association they recommend limiting the consumption of added sugars to no more than half of your daily calorie allowance. For the average American women they do not need to consume more than one hundred calories per day which equals to six teaspoons of sugar. Men on the other hand are able to consume a little more sugar to the toon of

Figure 11 Pancreas

nine tablespoons a day which equals to one hundred fifty calories. Children under the age of two should not be consuming any added sugars. The American Heart Association also recommends a daily limit for added sugars. (Added Sugars. n.d., Retrieved 2-13-20).

The pancreas could be the one organ that is the most affected by sugar. The pancreas is a gland that is about six inches long and can be found in the abdomen. The pear shaped organ is also surrounded by the small intestine, liver, spleen, and

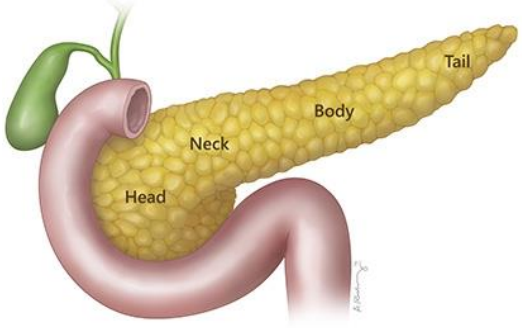


Figure 10 Pancreas

the gallbladder. The pancreas is comprised of two main glands, the exocrine gland and the endocrine gland. These two glands are in charge of digestion and regulation of the blood sugar. Blood sugar regulation is a very important process to the pancreas, within the blood sugar regulation process there are two hormones that play keys rolls in keeping the levels low. Insulin and glucagon work with the islet cells within the pancreas the help to produce and dispense insulin and glucagon into the bloodstream. The insulins main function is to lower the levels of the blood sugar while the glucagon's main roll is raise the levels of the blood sugar. When both the insulin and the glucagon work together they help maintain the appropriate levels of sugar within the blood. (What is the Pancreas? - Pancreatic Cancer Action Network/. 2018, April 6. Retrieved 2-13-20).

Without the proper production and regulation of the blood sugar from the pancreas other health problems can occur from the improper blood sugar imbalances. Two of the most known health related diseases associated with the pancreas are Type 1 diabetes and type two diabetes. Type 1 diabetes is where the body does not produce any insulin within the body. Without the production of insulin to help the glucose a Type 1 patient must take insulin for the rest of their life. Type 2 diabetes is more common than Type 1. A Type 2 diabetic may still be able to produce the insulin but the body does not know how to properly use the insulin. Type 2 diabetes can be controlled were as Type 1 can be harder to keep balanced (An Overview of the Pancreas. n.d., Retrieved 2-13-20).

When talking about sugar, one of the last organs we think that sugar can affect is the liver. The liver is a large vascular glandular organ of vertebrates that secretes and causes

important changes in many substances contained in the blood; converting sugars into glycogen which is stores up until required and by forming urea (Liver. n.d., Retrieved 2-13-20). The main disease that is linked to the liver is associated with alcohol and alcoholics, but since the nineteen eighties another damaging player with liver disease has emerged.

Fructose can be just as damaging as alcohol, which has led to the term non-alcoholic fatty liver disease. Non-alcoholic fatty disease is trigger by excess fat build-up, which thirty one percent of adults and thirteen percent of children suffer from and the number will continue to grow. One fact about fructose that is different from any other sugar is the fact that the liver is in charge of processing fructose. If a soda or any other kind of sugary drink were ingested on an empty stomach then the liver would be overflowed with more liquid sugar than it could handle. Sugar belly is also another term that is associated with liver problems.

Figure 12 Healthy Liver

Sugar belly is the result of too much fructose found in the liver which cannot be used for energy. Since the extra sugar cannot be used for energy the liver then turns the sugar into fat (The Toxic Truth. 2018, April 27, retrieved 2-13-20).

Traveling downward from the liver, sugar's next victim is the bowels. The bowel is the lower part of the digestive system. Another term for the digestive system is the

gastrointestinal tract or gut, when in a medical office the terms GI tract or GIT may be used as well (Coping with cancer. 2019, July 11, Retrieved 2-13-20).

The hollow muscular tube is responsible for processing all of the food that enters the body so it can break down the food into nutrients for the body to use. The bowel also clears the body of any solid waste which is also referred to as stool or feces. Divided into two section the bowel is home to the small intestine and the large intestine. So how does sugar play a part with the bowels, well sugar stimulates the gut. When the gut is stimulated it produces water and electrolytes that help to loosen the bowel so a movement is produced.

The consumption of too much sugar can cause the stomach to become upset by stirring up the bacteria in the gut which in turn can cause diarrhea. Apples, peaches, and cherries all contain fructose which is one of the leading causes of diarrhea. Artificial sweeteners such as sorbitol, mannitol, and xylitol which are found in candy and medication can also lend a hand in causing diarrhea (Harvard Health Publishing. n.d., Is something in your diet causing diarrhea? Retrieved 2-13-20). The best way to prevent diarrhea is to eat a diet high in fiber, fruits, and vegetables.

Figure 13 Stomach

The body also needs water for hydration, drinking six to eight glasses a day is the recommended amount. If the sugar is not removed from the bowels then IBS also known as Irritable Bowel Syndrome can occur. Irritable Bowel Syndrome symptoms includes poorly

absorbable and highly gas forming carbohydrates, in the medical world these are known as FODMAPs which means Fermentable, Oligosaccharides, Disaccharides, Monosaccharides and Polyols. Apples, pears, and artificial sweeteners fall into the FODMAP group and if left out of the diet the risk of Irritable Bowel Syndrome can be decreased (About Us. n.d., Retrieved 2-13-20).

Yes, sugar can even affect the bladder and here is how. The bladder is like the bowel, it is a hollow muscular organ that collects and stores urine from the kidneys before it is secreted (Urinary bladder. 2020, February 16. Retrieved 2-13-20). Bacteria can be found in the bladder which presents a problem when sugar enters the body. Sugar loves bacteria and the bladder is a great breeding ground for danger. When bacteria and the overabundance sugar of sugar in the body are mixed together the acid levels rise and thus a Urinary Tract Infection or UTI is born. This can be one of the first signs that a person may be a risk for diabetes (How Eating Sugar Can Cause Urinary Tract Infections (UTI). n.d., Retrieved 2-13-20).

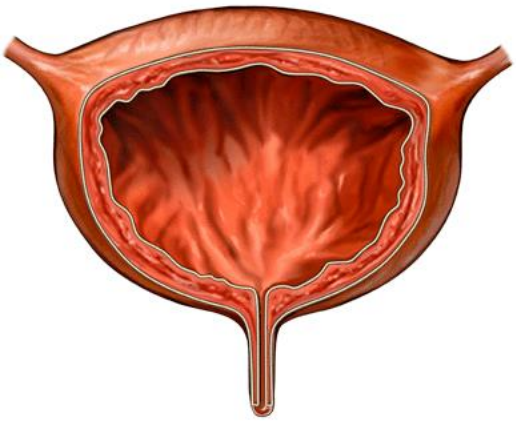


Figure 14 Bladder

Consuming too much sugar can also be a major factor in both men and women's sex drive. The body produces leptin which is a hormone that keeps your body in check as to when the body is full and also controls sexual desires. If the body has too much sugar then the leptins become resistant and this can cause the sex drive to become weak or non-existent. Large amounts of sugar in the body can also lead to fatigue which also affect the sex drive. The excess

sugar will eventually turn into fat which also can hinder sexual activities due to either the man or women not feeling good about the weight gain or the fact that intercourse itself may not be as satisfying as it once was.

Estrogen from the women and testosterone from the men both need protein to function properly so when the SHBG, sex hormone-binding globulin, does not get the protein produced by the liver then the drive for sex is weakened. Looking into the men's side of things first. If a man has high blood sugar levels or blood sugar levels that cannot stay balanced then more than likely they will have a hard time maintaining an erection. If the blood sugar levels continue to stay high over long periods of time then erectile dysfunction can occur, but this is mostly in men who are diabetic or on the verge of being diabetic. Women on the other hand have a little more to be concerned about. If a women consumes a diet high in sugar this can lead to yeast infections along with urinary tract infections and bladder infections. The symptoms can range from an uncomfortable itchy feeling, vaginal pain, and irregular menstrual cycles (Gill, J. 2018, July 10. Sugar could be affecting more than you think. Retrieved 2-14-20).

Inching down to the legs and feet one might think how can sugar possible affect these appendages? The leg is the entire lower limb of the human body, including the foot, thigh and the hip (The Editors of Encyclopedia Britannica. 2020, January 31. Leg. Retrieved 2-14-20). Once again having high blood sugar levels contributes to having problems with the legs. In this case having high blood sugar levels can lead to diabetes, which causes diabetic neuropathy in the legs.

Diabetic neuropathy is due to having high blood sugars levels for an extended period of time, which can wreak havoc on the nerves and cause damage. The nerves are meant to send

signals or messages to other organs and muscles throughout the body. When the nerves become damaged the signals and message become interrupted leaving the body confused. High blood sugars affects the long nerves from the spinal cord which allows for movement and feelings. When the blood sugar levels stay too high for prolonged periods of time the cells within the nerves will start to swell and eventually they will scar. After the nerve cells are swollen and scared the nerves are no longer able to send messages to the legs and feet properly. When the nerves are no longer able to receive messages properly the legs and feet start to loose feeling making it hard to feel pressure and pain.

Another side effect of nerve damage is the fact the muscles in the legs and feet being too loose their shape. This is especially dangerous for the feet when they lose their shape due to the bones and joints not being properly supported. Without the proper support the bones will begin to separate while the foot will become deformed, but this also causes issues for walking making it harder and very painful for walking and running. The loss of feeling in the feet can also lead to even more serious issues such as wounds that have a hard time healing or even that fact the wounds will not heal at all (Leg, foot, and organ damage with diabetes. n.d., Retrieved 2-18-20).

Figure 15 Nerve Damage to the feet

As the tour of the body comes to an end the last topic to touch on is mental health and mood swings. Even though mental health and mood swings are not visible like the eyes, legs, or feet, unfortunately they are still affected by sugar. A person's mood can greatly affect the

choices of food they choose to consume. If you are having a bad day or may be stressed because over tests or paying the bills, a tub of ice cream or a piece of cake is not the answer. While cake or ice cream may help to reduce stress at the time and give the body that feel good endorphin, your body is actually turning the carbohydrates into sugar. In the beginning the sugar does help to satisfy the mood cravings, but it does not take long for the blood sugar levels to rise, increases the heart rate, and gives off the feeling of energy. After eating all of the sweet treats some people may start to feel tired or worn out and headaches can also occur.

Once the sugar high has worn off the body gets into a routing of craving sugar, almost like drug addicts crave drugs some people crave the effects of the sugar high. According to James DiNicolantonio a cardiovascular research scientist at St. Luke's Mid-America heart institute in Kansas City, Missouri states that "refined sugar is similar to cocaine, a white crystal extracted from sugar cane rather than coco leaves, and studies show it can be more addictive that the recreational drug" (Wbur. 2015, January 7. Is Sugar More Addictive Than Cocaine? Retrieved 2-19-20). As the sugary processed foods are running rapidly throughout the body it is also causing inflammation to increase in the body and even the gut. The inflammation in the gut can also be related to mood disorders such as anxiety and depression.

Daily Life of Sugar

As the typical American continues to consume anywhere between twenty two to thirty teaspoons of sugar per day, which according to the American Heart Association is an extra three hundred fifty to four hundred eighty calories of sugar each day. This amount of sugar is over three times the recommended daily consumption of the sweetness day (Effects of Sugar on the Body. 2020, January 20. Retrieved 2-25-20). With an average daily diet consisting of processed

foods and foods rich in sugar, then more calories are taken in without any nutritional value. As more calories are consumed by the body, it is unable to defend off all of the sugar which leads to weight gain. For example, when a candy bar is consumed this makes the body feel satisfied for the moment, the down side is that the hunger feeling is still there. Typically what happens is the body says it needs something more to combat the hunger so most people will reach for the next sweet treat of empty calories. Over time the sweet treats and hunger lead to weight gain and higher sugar levels, this puts them at risk for being overweight or obese.

Learning how to control sugar craving can be hard for some people due to the fact that almost eighty percent of the food consumed contains sugar. The American Herat Association recommends that women consuming no more than one hundred calories which equals to about six teaspoons of sugar per day. Men are recommended to consume around one hundred fifty calories equaling to nine teaspoons of sugar per day (Effects of Sugar on the Body. 2020, January 20. Retrieved 2-25-20).

Children are also affected by the consumption of sugar. The typical child in the United States unfortunately consumes roughly nineteen teaspoons of sugar on a daily basis. Most of the sugar is consumed through soda, fruit flavored juices, sports drinks, and snack foods. The recommendation of sugar for children over the age of two is no more than six teaspoons. Children should not consume more than eight ounces per week of soda, sports drinks, or any other type of sugary drink. Any child under the age of two should not digest any added sugar, due to the fact they need a diet that is rich in nutrients. Here is a thought to sip on, if a child drinks a mountain dew, monster energy drink, or any other flavor of sugary drink on a daily basis

then the child will be sixty percent more likely to become obese. This kind of daily sugar consumption puts the child at risk for a lifetime of health problems (Jenco, M. 2020, February 14. AHA: Limit children's sugar consumption to 6 teaspoons per day. Retrieved 2-25-20).

Learning how to control sugar craving can be hard but here are a few tips to help ease into cutting back. Keep a daily log of all the sugar that you digest, this will help to see how much one is really taking in, and the results may be shocking. Even though the nutrition labels may be hard to read this is something that everyone must be aware of and use when shopping. Some key words to look for are sugar, syrup, and sweetener. Fructose, glucose, and sucrose all end in "ose" these words all mean sugar. Try to cut out one source of sugar per week, by doing this the body can adapt easier and does not go into sugar shock. Reducing the amount of sugar that is used in recipes such as homemade breads, rolls, and muffins. Cutting back on sugary drinks such as McDonald's sweet tea, try drinking unsweet tea with a twist of lemon.

Healthy Diet Plans and Foods

Over and over the same old song and dance of it is expensive to eat healthy. Actually it is not that expensive to eat healthy and once the routine is started it is easier to continue. Consuming foods that are as close to the way nature made them can lead to significant differences of the way one thinks, looks, and feels.

There are so many fad diets to choose from today such as Atkins, South Beach, Vegan, Ketogenic, Paleo, The Zone, The Dukan and The 5:2 Diet. Do not worry this are still many more fad diets out there if none of the others seem appealing. Instead of getting on and off of the fad

diet roller coaster try eating a well-balanced diet. A well- balanced diet consists of protein, fat, carbohydrates, fiber, vitamins, and minerals. Almost all of the fad diets will cut out one of the main nutritional groups, for example the Atkins diet cuts out carbohydrates to help the body burn the fat away instead of the carbohydrates providing needed energy.

Protein is an important part of the daily diet as it provides energy to the body, helps with cognitive functions and also plays a roll with one's mood. Protein is very important for building, maintaining, and repairing tissues, cells, and organs within the body. There are two ways protein can be found the first is through animals such as poultry, fish, eggs, and dairy which contain amino acids that is needed in the body. The second way of receiving protein are through plants such as grains, beans, vegetables, and nuts. Consuming a variety of the animal and plant based foods the body will get the appropriate amounts of protein needed. For example processed lunch may can be a source of protein but on the flip side the meats are full of salt which can cause other health issues. Another way protein can be consumed is through supplements such as protein powders, shakes, and snack bar (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

Some great benefits of protein include increased amounts of energy, maintains heart health, keeps the immune system properly working, aids in maintaining the respiratory system and speeds recovery from exercise. Protein also plays an important role in children for their development and growth as well as senior citizens to help maintain their health. Anxiety, depression, and stress can also be reduced by consuming protein along with the changing of one's mood. Protein can also reduce the risk for cardiovascular disease and diabetes. Having a

high protein diet can also help the overall body appearance such as healthy skin, nails, hair, and even helps to build muscle mass. (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

Fats play a major role in the daily diets as they help to control cholesterol levels. Energy is also produced from fat along with the absorption of vitamins which aid in the help of protecting the heart and brain function. There are two types of fats known as "bad fats" which and "good fats". The bad fats known as artificial trans fats or saturated fats and are mainly found in baked pastries, cookies, donuts, pizza dough, popcorn, and French fries. Saturated fats are not as bad as the trans fats but they still leave a mark on the body. Moderation is the key when consuming saturated fats such as beef, lamb, pork, whole-fat dairy items, butter, and lard. These foods should be limited to ten percent of the daily intake of calories (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

The "good fats" which are monounsaturated fat and polyunsaturated fats are essential for the body due to the fact they help the heart, cholesterol and the overall health of the body. Monounsaturated fats can be found in olive oil, canola oil, peanut oil, avocados, olives, and nuts. Polyunsaturated fats can be found in sunflower seeds, sesame seeds, flaxseed, walnuts, fish, and soymilk to name just a few. Omega-3 is a type of polyunsaturated fat that is very beneficial to the bodies overall health. Salmon, mackerel, tuna and trout are great sources of omega-3. When consuming a diet rich in omega-3s the risk for depression, ADHD, and bipolar disorder are reduced along protection against memory loss and dementia. The risk of having a stroke, heart disease, and cancer are also reduced by omega-3s (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

Eliminating trans fats from the daily diet will help the bodies overall health. Label reading is very important when trying to eliminate trans fats from the diet. Store bought salad dressings are full of unhealthy fats and added sugars, a homemade dressing of olive, flaxseed and sesame oils is preferred. Try to cut out foods that are commercially baked as well as fast food products (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

Roughage another term for fiber is a dietary need in the daily diet. Most people think fiber is mainly used to help aid in moving the bowels when stopped up, but actually fiber does more than help the digestive tract. Fiber comes from plant-based foods like grains, fruits, vegetables, nuts, and beans. These plant-based foods do not break down in the bodies system, since they cannot break down the body passes these foods through undigested. The undigested plant-based foods are responsible for keeping the digestive tract clean along with the aid of easier bowel movements and also helping to flush cholesterol and other carcinogens that can be harmful to the body out.

There are two ways in which fiber is consumed and they are by the means of insoluble and soluble fiber. Insoluble fiber which does not dissolve in water is found in whole grains, wheat cereals, carrots, celery, and tomatoes. These are the fibers needed to help prevent constipation. Soluble fiber is the second means of fiber that does dissolve in water. Soluble fiber also helps to control blood sugar levels and aid in the reduction of cholesterol. When barley, oatmeal, beans, nuts, apples, berries and citrus fruits are consumed they provide the soluble fiber the body needs. There are many foods that contain both insoluble and soluble fiber. One key thing to remember is that, the more natural and unprocessed the food is the higher the

fiber content will be. Fiber will not be found in meat, dairy, and sugar. There are also foods that have been refined such as white bread, white rice, and sweet treats that have all had the their fiber or most of the fiber removed (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

Fiber offers many health benefits for the body such as digestive health, better control of diabetes, cancer, skin health, and heart health. The digestive tract benefits from fiber by helping in normal bowel movements by bulking up the stool so it is easier to pass which aids in the prevention of constipation and diarrhea. Fiber also aids in the reduction of inflamed intestines better known as diverticulitis, hemorrhoids, gallstones, kidney stones and gives some relief for people that suffer from irritable bowel syndrome (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

The risk for type 2 diabetes is also reduced if a diet that high fiber is consumed, if diabetes has already been diagnosed then fiber can help to slow down the absorption of sugar which in turn will help improve the blood sugar levels. Cancer can also be related to fiber as it can possibly help in the prevention of colorectal cancer. Not only can fiber aid in colorectal cancer but also helps fight against digestive system cancers such as stomach, mouth, and pharynx. Psyllium husk a form of fiber that is a plant seed can help eliminate the toxins from the body providing a glowing look for the skin (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

A heart-healthy diet that is made up of soluble fiber is very beneficial for the heart. The soluble fiber helps to reduce the levels of cholesterol by lower what is considered the bad cholesterol levels know as low density-lipoprotein. Intake of a high fiber diets can reduces

the risk for metabolic syndrome, coronary heart disease, diabetes, and stroke. Low blood pressure, improved levels of high density lipoprotein, and reduced inflammation are all health factors that fiber can help reduce (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

Convenient and cheap fast food definitely does not pack the amount of daily fiber as needed. Fast food meals are loaded with large amounts of sodium, calories, and unhealthy fats. Instead of the double cheeseburger, fried chicken sandwich, and French fries look for alternative choices such as salads and vegetables if they are provided. Another option if salads and vegetables are not offered is to have the cheeseburger or chicken sandwich on a whole wheat bun or some kind of whole wheat bread. For dessert try looking for fresh fruit items, fruits cups, or yogurt parfaits instead of the traditional slices of cake, pies, or the loaded sundae (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

A few healthy fibers tips are to start the day with whole grain cereals. Brown rice and whole grains should be used to replace white rice, white bread, and pasta. Avoid commercial baked products with homemade breads, muffins, and cookies instead baked with whole grain flour, do note that whole grain flour is heavier than white flour. Adding flaxseed to yogurt, applesauce, and breakfast cereals boost the omega-3 fatty acids (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

Fiber supplements are another way to get the daily amount required but they are not the best way to receive fiber. The supplements be can dissolvable powders, chewable tablets, and even wafers. Fiber supplements do not provide the same victims, minerals, and other nutrients that are provided by high fiber foods. Make sure to consult with a doctor before taking supplements and prescribed medication as the supplements may interfere with the

medications especially antidepressants. Diabetics also need to consult a doctor before taking supplements due to the fact they may interfere with blood sugar levels. Supplements can also cause abdominal bloating and gas, it is necessary to start with small amounts of supplements at first and drink plenty of water and fluids (Healthy Eating. 2020, February 16. Retrieved 3-1-20).

One key nutrient that is skipped over in most diets is calcium. The nervous system, heart, muscles, and even cells within the body need some form of calcium. One of the main uses for calcium in the body is to strengthen bones as well as teeth, so that they remain durable throughout the stages of life (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

Calcium also aids in the prevention of blood clots, keeps the heart in rhythm, as well as the muscles contracting. If the body does not receive the adequate amount of calcium through the diet then the body will gradually take what calcium is straight from the bones. When the bones lose calcium via the body the risk for bones to become weakened and lead into osteoporosis. Anxiety, depression, irritability, sleeping issues, and mood swings can all occur when the lack of calcium or calcium deficiency is present in the body (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

Calcium is not only an important diet nutrient to the elderly community but also to children, teenagers, and young adults. Bones continue to build bone mass until one is their mid-twenties. From the point of the mid-twenties and on bone mass begins to decline when there is not an adequate amount of calcium in the diet. According to the National Institutes of Health food is the best source of calcium. The body is able to absorb calcium from food. Doctors recommend that you consume as much as possible of the daily amount of calcium needed from

food. Try to avoid supplements as the main form of receiving the daily amount of calcium, if a supplement is needed use a low-dose supplement make up for any small amounts missed (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

There are a number of foods that are rich in calcium. Dairy products are what most people are familiar with such as plain yogurt, mozzarella and cheddar cheeses, along with cottage cheese. Soymilk that is calcium fortified, milk which can be whole, two percent, reduced fat, and non-fat. Keep in mind that whole milk and whole milk dairy items are usually high is saturated fat. It is recommended to limit the intake of foods that are high in saturated fats and use an alternative source such as low or non-fat dairy items. Calcium fortified cereal also provides the daily required amount of calcium, remember to limit the cereal to one cup per serving (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

Leafy green vegetables are also another wonderful source of calcium. Turnip greens, kale, broccoli, Chinese cabbage and bok choy can be added to soups, casseroles and stir fries. Salads that contain romaine hearts, arugula, red leaf lettuce, mesclun, butter lettuce and watercress are great sourced of calcium. Fish such as pink salmon and sardines can also be added to a salad for extra nutritional value (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

Vitamins such as D, K, C, and B12 play important roles as they all contain calcium and help to distribute it throughout the body. Vitamin D aids the body in absorption of calcium and to regulate the calcium that is in the blood. When the body is exposed to the sun it

synthesizes the vitamin D, spending at least fifteen minutes in the sun every day is good for the body. Vitamin K's main duty is to regulate calcium and to help form strong bones. Dark green

Lettuce, Brussels sprouts, broccoli, collard greens, and kale provide a vitamin K when one or more servings are consumed daily. Vitamin C and Vitamin B12 are both crucial for bone health and the prevention of osteoporosis. Vitamin C not only helps the body's immune system but also helps to prevent bone loss. Citrus fruits such as oranges and grapefruits are packed with vitamin C along with other fruits like strawberries, kiwi, and mangos. Osteoporosis and bone density loss can be reduced by taking vitamin B12. Seafood preferably salmon, haddock, and canned tuna is a great way to consume vitamin B12 along with milk, eggs, and cottage cheese (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

A carbohydrate rule to keep in mind is the "good" carbohydrates contain a lower level of glycemic load that in turn can help to fight against Type 2 diabetes and cardiovascular issue in the long term. Good carbs are made up of unrefined whole grains, non-starchy vegetables, legumes, nuts, and fruit. The whole grains categories are made up of whole and multi grain breads, barley, brown rice, bran cereal, quinoa, and oatmeal. Spinach, Brussels sprouts, tomatoes, and green beans are a great source for non-starchy vegetables. Legumes such as lentils, kidney beans, pears, and baked beans should be included in the daily diet. Nuts also provide good carbohydrates and they are found in walnuts, peanuts, and cashew. Apples, citrus fruits, berries, and pears round out the fruit group (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

Making the switch to good carbs does not have to be hard it just takes so will power. The first rule to follow is to not totally ban all refined sugar but rather make then a special or occasional treat. If refined sugar was totally cut form the diet, you would crave refined sugar even more and that is the natural craving from the body. Once the intake of refined sugar is reduced the less the body will crave and want them (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

To eliminate all sugar for the human diet is unrealistic. Empty calories can be eliminated from the diet by cutting out the consumption of processed foods, since they offer no dietary nutritional value. Weight gain and the increase risk for serious health problems are reflected from empty calories. Cutting down on sugar can take time so be patient and allow the taste buds time to adjust to foods less sweet, this is called the weaning technique (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

Cooking at home will play a major role in what is consumed in the daily diet. Meals made with fresh fruits, vegetables, and meats will contain less sugar and benefit the body. Staying away from sugary soda drinks, fruit drinks and diet drinks will also aid less consumption of sugar. Also try cutting out packaged foods such as canned soups, frozen dinners and low-fat meals as they are packed with added sugars. Eating out is fun but be aware of what to order due to the fact that so many sauces, dressings, and gravies are load with sweet sugar, as an alternative is to ask for sauces, gravy, and dressings be served on the side. Healthier snacks that are naturally sweet will help ease the sweet tooth. Peppers, fresh fruits and peanut butter are great alternatives. Homemade frozen treats using fresh fruits for smoothies and fruit kabobs are great

to keep around for snacks. Always make sure to read food labels as many companies will hide sugar on the labels making it hard to know what some of the sugars are and if they are good or bad sugars (Healthy Eating. 2020, February 16. Retrieved 3-8-20).

If you are having trouble trying to maintain a healthy diet such as portion size, knowing which grains are better than others to consume, or correct amounts of fruits and vegetables you can always refer to the food pyramid. If in doubt the food pyramid is an excellent resource for daily needs of fruits, vegetables, grains, protein, fats, supplements, and even alcohol.

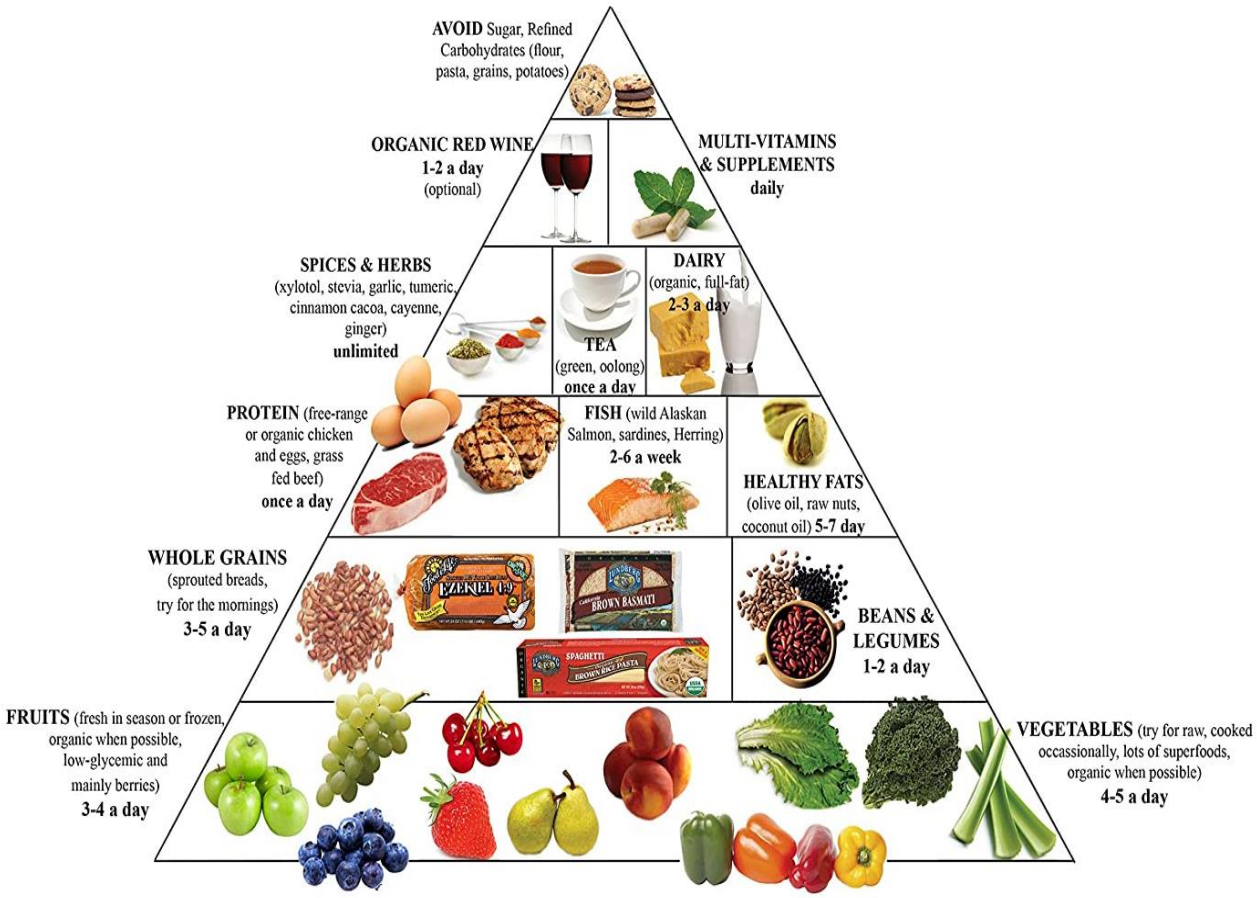


Figure 16 Food Pyramid

Helpful Guidelines in Transitioning for Person Success

Starting a new diet is not always easy especially in the beginning when food cravings are at the highest. Here are a couple of tips to aid in the success of a diet. The first tip is to stay away from processed or packaged foods which are so easy to grab on the go or when feeling lazy. Cooking at home can help to eliminate the consumption of processed or package foods. When cooking your own meals this allows you to be in control of what is being prepared as well as knowing how many calories are in the entire meal. While keeping an eye on the calories you are also able to leave out any foods that may have chemicals added such as hormones along with added sugars and salt. Preparing a meal at home also has many positive effects such as the overall way you look and feel, an increase in the energy levels, helps your mood and you will also notice a difference in your weight. Sleep and stress are also reduced by eating a healthier diet. Healthy meals also create a better immune system along with the lowered risk of illness such as heart disease, cancer, high blood pressure and diabetes. Children also benefit from healthy home cooked meals as their energy is stabilized instead of bounce all over the place from processed foods (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

Another tip for success is to make sure when reducing the amount of processed or unhealthy foods that you replace them with healthy options. An example of this would be switching from fried foods such as chicken to grilling the meat or having grilled salmon. Also make sure that you are reading the labels as some companies hide sugar in the label or the foods are marketed as healthy, when in turn they are loaded with unhealthy additives (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

One of the best tips that is easy and always overlooked is water. Water is very important for the body as it helps to flush out toxins and waste products from that are consumed. Water is essential for keeping the body hydrated, as many people do not drink enough water daily they become dehydrated and do not even realize they are in need of hydration. As water keeps the body hydrated it also allows you to make healthier food decisions. The lack of water can be linked to headaches, lack of energy, and the feeling of being tired (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

The Importance of Moderation

The term moderation means the quality of doing something within reasonable limits (definition in the Cambridge English Dictionary. (n.d.). Retrieved 3-22-20). The reasonable limit of food is moderation as the body will consume as much food as it needs. Moderation means eating less than what is consumed presently, so the reality is not to keep eating and stuffing your gut but to eat until you are satisfied (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

Moderation does not mean that you have to give up all of your favorite foods but rather cut back on the amount that is consumed. If you make foods off limits or ban them, then the craving can turn into failure which can lead to larger issues. When you slowly reduce the amount of your favorite foods consumption then the desire for the food tends to become weaker. Limit your favorite desserts to special occasions, you may find that you do not like your favorite dessert once it had been left out of diet for a period of time (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

Serving sizes are also a key factor when on a diet. Here are some ideas to help while preparing a plate at home. When serving meat, fish, or chicken the portion should be the size of a deck of cards. Mashed potatoes, rice, and pastas serving size should look like regular home light bulb. A trick for the brain is to use smaller plates or bowls so that the portions look larger. By the end of the meal if you are still hungry and unsatisfied then try adding more leafy greens or fruits to the meals (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

As our lives are busier than ever people tend to rush to eat breakfast, lunch, and dinner which is not good for the body and the digestion of food. When slowing down the eating process this allows the body to send messages to the brain as to when you are full, eating fast will also pack on extra pounds as the brain will not receive the message until you have overeaten. So the main tip is to slow down and stop eating before you feel full. Also eating with others is another alternative to eating at a slower rate and also helps to prevent overeating (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

Adding more fruits and vegetables will help to eliminate snack food cravings. Fruits and vegetables will also offer more vitamins, minerals, antioxidants, and fiber which the packaged snack foods do not offer. When naturally filling up on fruits and vegetables you will also be reaching the recommended daily amounts which is at least five servings. A serving is considered to be a half of a cup of raw fruits or vegetables or a banana or small apple (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

Remember that eating a healthy diet is not about unrealistic goals, depriving yourself of food, or setting strict limitations. A healthy diet is having more positive energy, improving your

overall health and boosting the overall health of the body apple (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

Exercise Routines

Exercise is a key factor to staying healthy along with a well-balanced diet. All bodies are different and therefore a mixture of exercises is recommended. According to the Physical Activity Guidelines for Americans from the United States Department of Health and Human Services urges all adults to include the following types of exercises in their weekly workout routines (Healthy Eating. 2020, February 16 Retrieved 3-22-20).

Moderate aerobic exercise of one hundred and fifty minutes per week or seventy five minutes of vigorous aerobic activity. Two or more strength training session per week, but allow a forty eight hour span in between the training session as the time span gives the muscles time to recover. Older adults may be a risk for falls so a balance exercise is recommend for that age group. Workouts can also be done in smaller time blocks such as ten minutes sessions three times a day to meet the daily suggested requirements (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

Getting started on an exercise routine can be difficult at first but do not let it scare you off. Here are some tips on getting started. Find a group or a friend around the same age frame and start slow with walks around the neighborhood or the local park. Make sure that you have a good pair of shoes as your feet need a supportive sole to cushion the bottom of the foot. Also make sure you are dressed appropriately for the workout, dress in layers depending on the time of year as you do not want to overheat yourself. Make sure before you start your exercise routine that you do a five minute warm up to stretch the muscles before you start and also do a

cool down phase at the end to let the muscles relax cost (Healthy Eating. 2020, February 16. Retrieved 3-22-20).

Mandatory Sugar Labels

The Food and Drug Administration also known as the FDA will be mandating a sugar label policy for packaged foods and beverages which will take effect in 2020 and 2021. The new policy change is aimed at being a cost effective way to help generate health gains and cost savings for the healthcare system along with the general population (Lagasse, J. (n.d.). Mandatory sugar labels could generate healthcare savings, improve health in a cost-effective way. Retrieved 3-30-20).

The new sugar labeling policy changes were presented in 2016, they had not had a major revision since 1993 which was over twenty three years ago. The new labels are a way to provide consumers with additional nutritional information. Some of the new changed included adding the grams and percent Daily Value of added sugar which will help consumers limit the number of calories from added sugar, which was in line with the Dietary Guidelines from 2015-2020 (Lagasse, J. (n.d.). Mandatory sugar labels could generate healthcare savings, improve health in a cost-effective way. Retrieved 3-30-20).

With the change in the sugar labeling policy the Food and Drug Administration has set forth this could help to prevent or at least postpone almost one million cases of cardio metabolic disease which includes heart disease, stroke, and Type 2 diabetes. This could possibly take up to twenty years if people follow the guidelines. The sugar labeling policy will also have an effect on the packaged foods and beverages as they will have to reduce the amount of sugar in these items. The reduction of the sugar in the packaged foods and beverages could help to eliminate

almost three million cases of cardiovascular disease and heart disease over the same twenty year period (Lagasse, J. (n.d.). Mandatory sugar labels could generate healthcare savings, improve health in a cost-effective way. Retrieved 3-30-20).

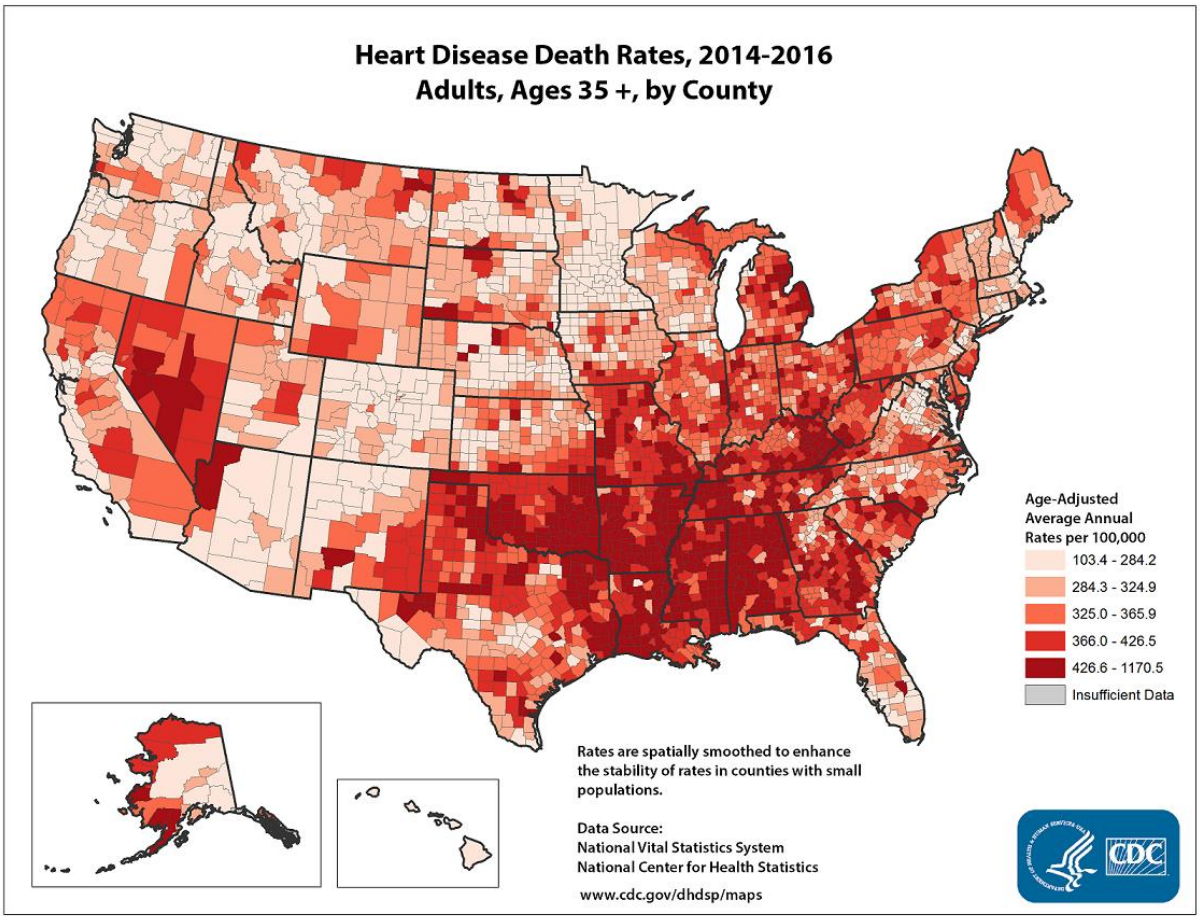
The sugar labeling policy will come with some cost as well as savings. The cost of the new label was estimated to roughly be around $1.7 billion which seems really high. The cost savings from the labels are shocking to the tune of $57.6 billion being saved on healthcare alone and $113.2 billion in societal costs. With the new sugar labeling policy coming into effect this can be a great way for consumers to make better choices and to reduce the sugar intake (Lagasse, J. (n.d.). Mandatory sugar labels could generate healthcare savings, improve health in a cost-effective way. Retrieved 3-30-20).

Healthcare Costs Associated with Sugar

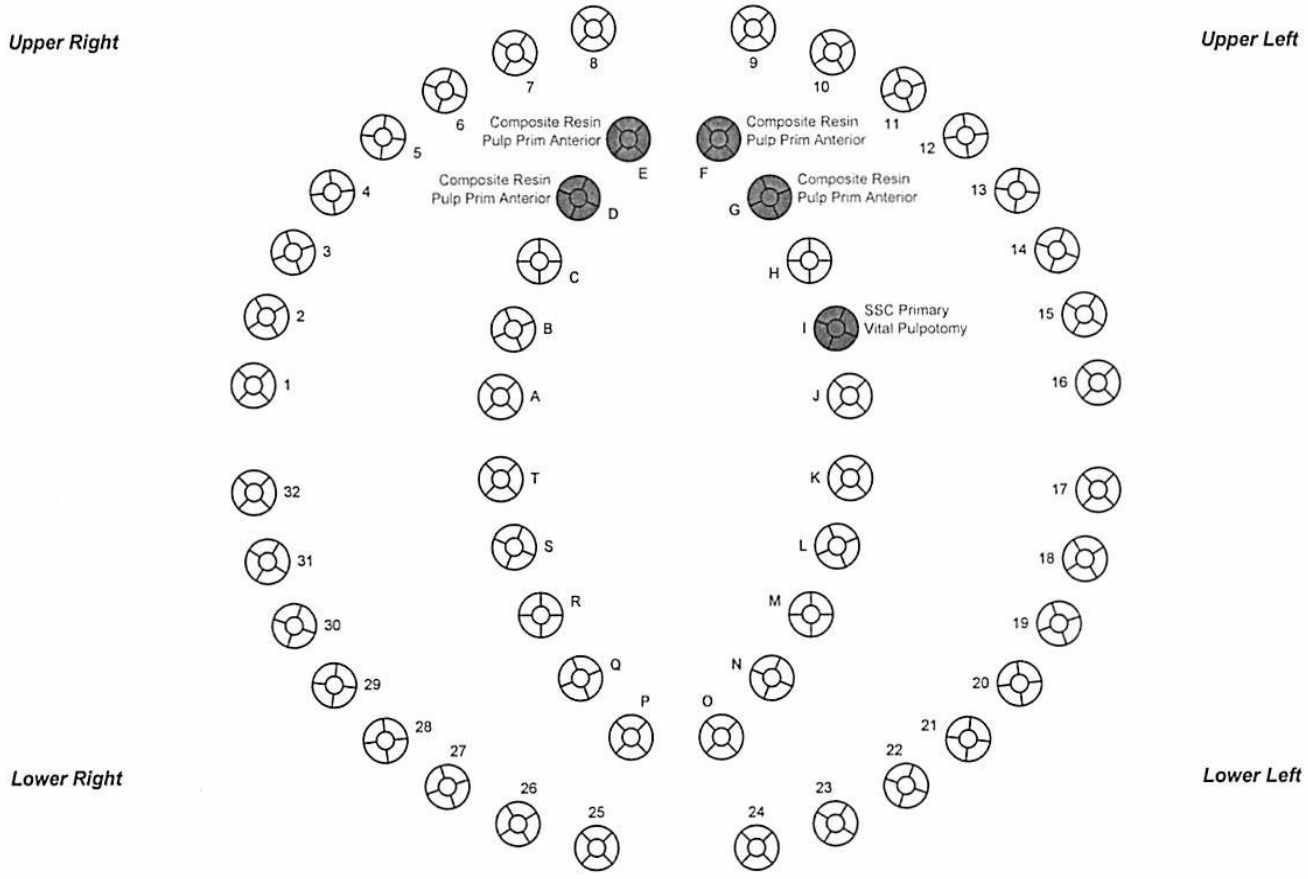
When American consume more that the daily amount of sugar not only are they putting themselves at risk for an unhealthy lifestyle but they are also putting a strain on their wallets and healthcare providers. The price tag is a hefty $50 billion for unhealthy Americans as the figure includes adults and children.

Heart disease is the leading cause of death for men, women, and most racial and ethnic groups in the United States. The average cost to treat cardiovascular disease in 2014-2015 was $219 billion a year, with one American dying every thirty seven seconds. The total deaths from heart disease each year is an amazing 647,000. The cost of heart disease also includes health care costs, services, medications, and the loss of productivity due to death (Heart Disease Facts. 2019, December 2). Retrieved 3-30-20).

The map below shows what the heart disease death rates looked like in the United States durin the years of 2014-2016. As you can see the states of Kentucky, Tennessee, Alabama, Georgia, Mississippi, Lousiana, Oklahoma, Arkansas, and Missouri have the highest rates of death.



This is an actual bill for a child with baby bottle carries. The total for five baby teeth was $2,569.00. This procedure took place in the operating room since the child was two years old (provided by William F Taylor DDS Hendersonville, TN.).



Proc#	Description	T#	Surfs	Fee		Est Ins	Est Ins Disc	Est Pat Shr
D2930	SSC Primary	I		$260.00	*	$54.50	$76.00	$129.50
D3220	Vital Pulpotomy	I		$149.00		$88.00	$39.00	$22.00
D1120	Prophy Child			$52.00		$47.00	$5.00	$0.00
D9420	Hospital Call			$325.00		$0.00	$0.00	$325.00
D1208	Fluoride			$31.00		$22.00	$9.00	$0.00
D2335	Composite Resin	E	MIDFL	$267.00		$114.40	$124.00	$28.60
D2335	Composite Resin	F	MIDFL	$267.00		$114.40	$124.00	$28.60
D2335	Composite Resin	G	MIDFL	$267.00		$114.40	$124.00	$28.60
D2335	Composite Resin	D	MIDFL	$267.00		$114.40	$124.00	$28.60
D3230	Pulp Prim Anterior	E		$171.00		$88.80	$23.00	$59.20
D3230	Pulp Prim Anterior	F		$171.00		$88.80	$23.00	$59.20
D3230	Pulp Prim Anterior	G		$171.00		$88.80	$23.00	$59.20
D3230	Pulp Prim Anterior	D		$171.00		$88.80	$23.00	$59.20
	Treatment Visit 1 Total			$2569.00		$1024.30	$717.00	$827.70
	Total of Proposal			$2569.00	**	$1024.30	$717.00	$827.70

*Patient portion includes deductible of $50.00
**Est Ins exceeds available benefits of $1431.00

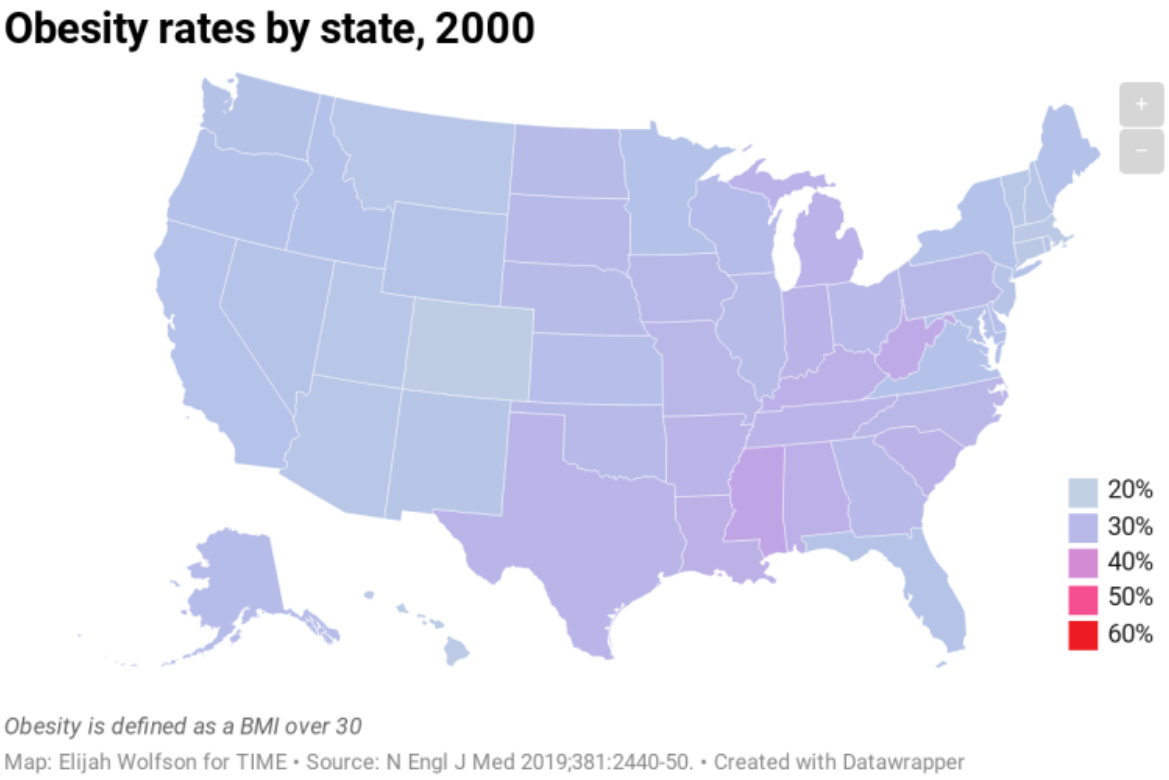
Diabetes as well has a huge cost to the healthcare system as well as the patient. In 2017 the estimated cost associated with diabetes was $327 billion which increased by twenty six percent from the previous estimate that was $245 billion in 2012. The time lost in productivity averages $90 billion. The major expenses for diabetics are inpatient hospital care and prescription medications to treat compilations of diabetes which are thirty percent of the total medical cost. Anti-diabetic agents and supplies needed are fifteen percent of the cost while routine doctor visits take up thirteen percent of the cost. The average cost for a people diagnosed with diabetes is $16,752 per year (The Cost of Diabetes. (n.d.). Retrieved 3-30-20).

If we as Americans do not stop to take the lead on the obesity crisis, then we are putting our children's health and the future of their adult health at risk. This would lead to the first generation of Americans that would be living sicker and dying younger than their parents and even their grandparent's generation. According to the 2019 IDF Diabetes Atlas, worldwide there were approximately 463 million adults between the ages of twenty and seventy-nine living and maintaining diabetes. The number is projected to grow to 700 million by 2045. Worldwide there are at least 1.1 million adolescents and children living with Type 1 diabetes (National League of Cities Institute for Youth, Education & Families. (n.d.). Retrieved 4-7-20).

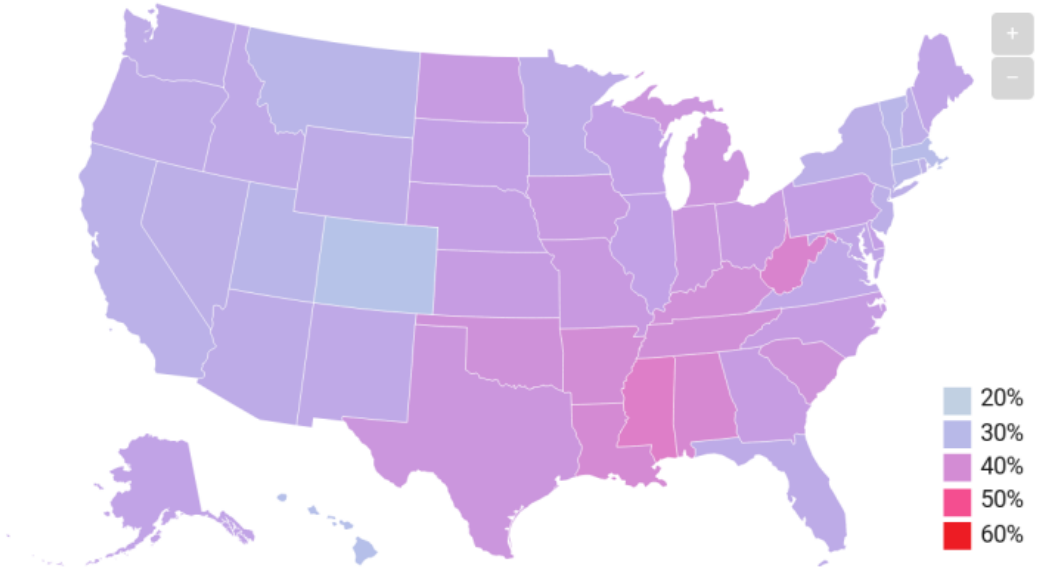
Over the past four decades in the United States childhood obesity rates have quadrupled and even today more than 23.5 million children are overweight or obese. Obesity plays a major role in the economic costs that in turn will affect all Americans. The estimated annual healthcare costs for issues related to obesity are close to $190.2 billion which is almost twenty-one percent of annual medical spending in the United States. Childhood related obesity costs have

skyrocketed to $14 billion in direct medical costs. If Americans continue to stay on the same path the future obesity costs will affect not only healthcare but also higher costs for disability and unemployment benefits. Business and industries are already being affected by obesity-related job absenteeism with an annual effect of $4.3 billion dollars (National League of Cities Institute for Youth, Education & Families. (n.d.) Retrieved 4-7-20).

The next three maps show how the obesity rates have increased from 2000 to 2019. Nineteen years is not a long time for a large spike in obesity (Park, A. (2019, December 18). Mapped by State: Half U.S. Population Will Be Obese by 2030. Retrieved 4-7-20).



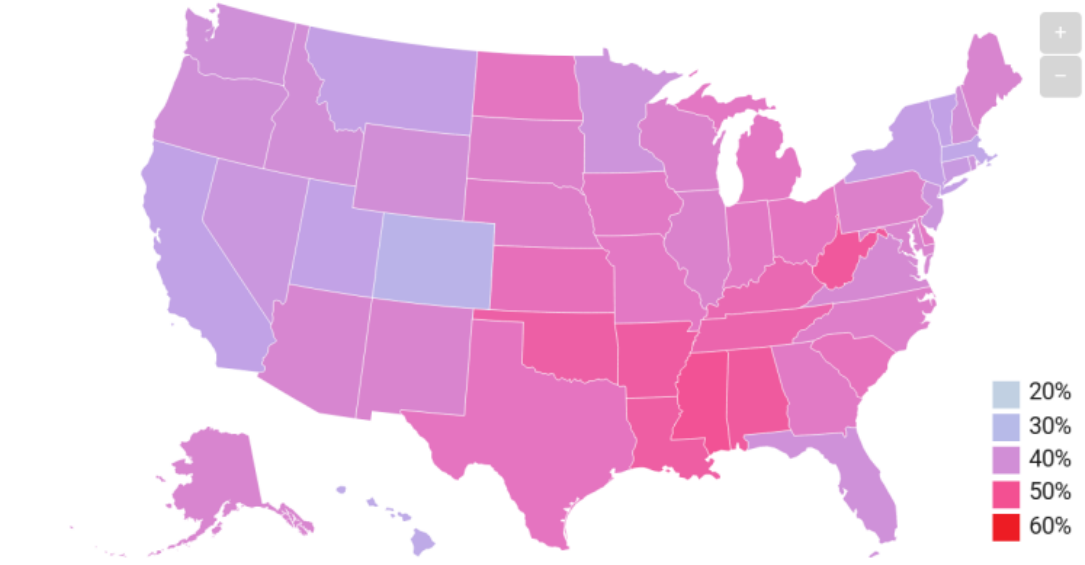
Obesity rates by state, 2010



Obesity is defined as a BMI over 30

Map: Elijah Wolfson for TIME • Source: N Engl J Med 2019;381:2440-50. • Created with Datawrapper

Obesity rates by state, 2019



Obesity is defined as a BMI over 30

Map: Elijah Wolfson for TIME • Source: N Engl J Med 2019;381:2440-50. • Created with Datawrapper

Insurance companies are also effected by the high rates of heart disease, dental caries, diabetes, and obesity. Insurance premiums are based on personal information that the consumer provides to the insurance company. When buying insurance the consumer should always disclose any health issues at the time of purchase. If the consumer fails to disclose health issues then the insurance policy could be cancelled. For example a person that is obese will likely pay a higher premium than the healthy average American. The obese person is also more likely to have high blood pressure, which is a major risk factor for heart disease or stroke. The high blood pressure also leads to problems with cholesterol and sudden death. This same obese person is also more likely to develop type two diabetes than someone who is in a moderate weight range. As we see the snowball effect of just being overweight and the complications that arise, the insurance companies are raising rates to keep up with the cost of patients (How Obesity Affects the Health Insurance Premium. (2020, April 9). Retrieved 4-7-20).

To Sum up Sugar

As we have seen throughout this paper sugar affects almost every major body part within the human skeleton. It is hard to imagine that something so good and sweet like sugar can have such negative and costly effects on the brain, eyes, teeth, heart, pancreas, liver, stomach, bowels, legs, feet, mental health, and the sex drive.

Sugar may taste good but it does leave a hefty mark on the body and the wallet. The best way to stay healthy is to follow the nutritional guideline set by the Unites States Department of Health and Human Services, United States Department of Agriculture and the Dietary Guidelines for Americans. Proper food and nutrition are vital roles in health promotion and the prevention

of chronic disease. The guidelines are also important factors for the healthcare workers and the policymakers as they help guide Americans to a healthier lifestyle (n.d.). Retrieved4-7-20).

As I was writing this paper I incorporated much of the knowledge that I learned from researching sugar into mine and my families' daily lives. On a daily basis you really do not realize how much sugar that you do consume, one little candy bar here, a soda refill there and before you know it, you have consumed more that the daily allowance without even noticing. A few changed that I have made in my personal life are to not leave a restaurant with a cup refilled with soda. We do not drink sodas in my house and I treat myself at times to a soda with certain lunch options, but I have stopped leaving the restaurant with the cup of refilled soda to sip on all day. The only thing the cup of soda was doing to me while sitting at my desk was adding unwanted sugar to my gut. I also recommended that friends and family try this little idea when they were out at lunch, most said they did not realize how fast the weight can pile on by just sipping a soda all day long.

Hopefully Americans will choose to go down the healthier path to help prevent lifelong diseases caused by the sweet tooth.

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