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Artificial Transitive Fatty Acid (TFA) Ban in Restaurants in US Cities: NYC-DOH TFA Ban as a Model for Proactive Public Health Policy

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**ARTIFICIAL TRANSITIVE FATTY ACID (TFA) BAN IN RESTAURANTS IN US
CITIES: NYC-DOH TFA BAN AS A MODEL FOR PROACTIVE PUBLIC HEALTH
POLICY**

By Vidia S. Ramdeen

SUBMITTED IN PARTIAL FULFILLMENT OF REQUIREMENTS FOR THE DEGREE OF
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APPROVED BY: _____ *Dr. Joseph Marreale*

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Chapter I

Introduction:

The 20th century is a period that has undoubtedly benefited from the breakthroughs of science and the subsequent technologies that have improved all of our lives. More specifically, breakthroughs in what may be termed as “food science” have, among other benefits, enabled prepackaged foods, such as canned goods, to have a much longer shelf life. As the U.S. population increased through the early 20th century, advanced progress made within the agricultural sciences and the food manufacturing and processing industry became evermore necessary as food items had to reach farther markets and ultimately, feed a growing and more selective population. The period in American history between 1860 and 1930 marked the first period of mass immigration since the arrival of the Mayflower.

Mostly of Russian, Eastern and Southern European ancestry, these populations arrived in the United States with their own styles of food preparation, cooking and ingredients. Largely settling on the East Coast, namely NYC, in the boroughs & neighborhoods of Brooklyn, Queens, Manhattan, the Bronx and Staten Island, these immigrants would soon own and operate the earliest pizzerias, bakeries, and other eateries that constituted the local food market in NYC. Food consumption during this early period in American history up to the early 20th century emphasized the use of suet, or animal fats, as the primary cooking ingredient in restaurant foods.

Then early in the 20th century, partially hydrogenated vegetable oil, invented to be a cheaper alternative to these animal fats, went into circulation. These cost advantages came via greater stability during frying, increasing average shelf life, and for all intensive purposes, can turn margarine and vegetable shortening into butter (consistency, melting point, and tasted texture).

Today, restaurants, including all eateries that operate within New York City, as well as restaurants across the country, regularly use a rather large amount of an artery-clogging agent, commonly found within their vital ingredients. Artificial transitive fatty acid, or trans-fat as known to the consumer, is the target of the NYC Board of Health and Mental Hygiene, medical experts, and health conscious consumers, for permanent removal from all NYC restaurant menus by July 2008. Specifically, the NYC health code now requires that all establishments holding a NYC health Department permit, including all restaurants, caterers, stationary hot and cold vendors, and mobile food establishments, limit their use of trans-fat to an amount below 0.5 grams per serving.

This decision appears based on human consumption of artificial transitive fatty acids positive correlation in its relationship to the onset of heart disease. New York City, according to the NYCDOH board members, is said to suffer from high rates of heart disease, and therefore, should take a leading role in preventative health care measures.

The response from NYC restaurant owners and patrons, in large, has been mixed. The patrons have responded in favor of the ban by attending meetings and voicing their opinion about the removal of transitive fats from the menu.¹ The NYC health department surveyed restaurant owners and found that 60% of the 20,000 surveyed restaurants (out of approximately 24,000 aggregate restaurants) use partially hydrogenated oils in food preparation². News reporters covering the trans fat ban have asked not only restaurant owners, but also hot dog vendors about the ban, and their response has been less than positive. Many do not understand what trans fat is

¹ <http://www.nytimes.com/2006/10/31/nyregion/31health.html>

² <http://www.nytimes.com/2005/08/11/nyregion/11fat.html?fta=y>

nor understand what is being banned. There is no definitive word as to what substitutes have been chosen to replace ones laden with transitive fats.

The NYCDOH will offer educational material and technical assistance, via their website and the NYCDOITT 311 hotline, to assist cooks and restaurant managers in switching to polyunsaturated or monounsaturated oil. Restaurant inspectors will undergo training to enforce the transitive fat ban by examining each restaurant's ingredient list on oil and shortening labels. As of April 2008, the penalty for non-compliance, as determined through Administrative Tribunal hearing officers is the issuance of fines from \$200 to \$2000. Repeated violators will see increases in their fine amounts.

Background:

The genesis of this ban occurred on December 5th, 2006, when the NYC Department of Health and Mental Hygiene, (NYCDOH) approved an amendment to the Health Code to transition the restaurant industry, and other food service establishments, operating within NYC into eventually eliminating the use of artificial trans fat. This amendment is the culmination of two separate initiatives that will affect all New York City restaurants. "City restaurants in the Big Apple have until July 1 of this year to eliminate the artificial fats (in the form of oils, margarines and shortenings) from any foods that contain more than half a gram of trans fat per serving size." (Lofshult 2007)

However, my research primarily concerns the first initiative within the proposal. The first initiative is a partial phase-out of artificial transitive fat in all New York City restaurants. This proposal requires that within the first six months of the ban, restaurants must switch to oils, margarines and shortening that have < 0.5 grams of transitive fat per serving. After 18 months, all other food items sold would need to contain < 0.5 grams of transitive fat per serving.

However, packaged food items that are still in the manufacturer's original packaging when served within the restaurant or sold to takeout would be exempt.

In an effort to comply, many restaurants and several restaurant chains have already reduced or eliminated artificial trans fat, or just simply, was never used it in the first place. Artificial transitive fat does have substitutes, such as readily available heart-healthy oils (e.g., corn, canola, soy). The key about these substitutes is they are healthier oils, perhaps a bit more expensive, but do not change the taste of foods considerably. Restaurants can switch to transitive fat-free products with no significant increase in cost. So what is the prevailing reason for using transitive fat in our food?

Researchers at the Mayo Clinic (2003) in Minnesota, a well known not for profit medical practice whose mission is to, in part, serve as a reliable source of public information - offer this advice about transitive fats:

“Trans fats are more solid than oil, making them less likely to spoil. Using trans fats in the manufacturing of foods helps foods stay fresh longer, have a longer shelf life and have a less greasy feel. Initially, trans fats were thought to be a healthy alternative to animal fats because they're unsaturated and come primarily from plant oils. However, in 1990 scientists made a startling discovery: Trans fats appeared to both increase low density lipoproteins or (LDL) cholesterol and decrease high density lipoprotein or (HDL) cholesterol. LDL, or "bad," cholesterol transports cholesterol throughout your body. LDL cholesterol, when elevated, builds up in the walls of your arteries, making them hard and narrow. HDL, or "good," cholesterol picks up excess cholesterol and takes it back to your liver. More studies over the years confirmed this.”

Researchers at the Mayo Clinic (2006) have this to say in regard to checking labels:

“It sounds counterintuitive, but "fully" hydrogenated oil doesn't contain trans fat. Unlike partially hydrogenated oil, the process used to make fully hydrogenated oil doesn't result in trans fatty acids. However, if the label says just "hydrogenated" vegetable oil, that usually means the oil contains trans fat. Although small amounts of trans fat occur naturally in some meat and dairy products, it's the trans fats in processed foods that seem to be more harmful.”

This relationship between proper nutritional labeling and transitive fat elimination or reduction to fight cardiovascular disease will be clearer within the literature review section.

Rationale:

So, why do I hold such an interest in this ban on transitive fat? Well, this is the first ban of this kind within a city as populated as NYC. This essentially would establish a precedent for other major metropolis' to follow suit, with the idea that a ban on transitive fat content greater than half a gram (>0.5) would be beneficial to the overall health of the effected population. Secondly, this is a very blatant demonstration of governmental power and authority on the private operations of businesses operating within the restaurant & bar industry.

The NYC Department of Health and Mental Hygiene, with good intentions, had forced changes on the operations of small proprietors and corporate eateries. What is the scope of governmental control and authority over the operations of private business? Is this regulation beyond the scope of the laissez-faire legislation that is often cited as being most effective for private industry? Is the NYCDOH targeting the most responsible component to cardiovascular disease? These are important questions, as, other cities and counties, including Chicago, Illinois and Westchester County NY, respectively, are in talks of implementing similar bans on the amount of artificial transitive fatty acid that may be used.

The research objective is to determine whether the NYC ban on transitive fats can be juxtaposition as a national model. This is to say, if there is more resistance from business owners due to increases in operating costs then is benefits in health to the restaurant patron. The literature review has established the fact that there is enough empirical evidence available, for government at all levels throughout the world to further investigate the issue to at least limit the allowable amount of transitive fat served within their dominion. The question(s) proposed to be investigated and answered in this research is detailed below:

- 1.) Are the consumers that frequent restaurants aware of what transitive fat is?
- 2.) Have restaurant owners responded to the change in law?
- 3.) What is the most prevalent substitute for transitive fat use in NYC? Does this substitute contribute to other medical ailments (i.e., hypertension, obesity, etc.) or contain higher amounts of saturated fat?

Chapter II

B. Literature Review:

This chapter will seek to determine what exactly is artificial trans fat, what type of trans fat (animal or hydrogenated) will be banned, and what is the overwhelming evidence specifically supporting its ban within any major metropolis, particularly NYC. Lofshult (2007) states that the trans fats undergoing the ban are the artificially engineered ingredients added to many processed foods. These include baked and fried goods, salad dressings and margarine, used as a substitute for the much maligned, saturated fats. Once considered safe enough to replace saturated fats, artificial transitive fats have recently been clinically and empirically linked to heightened cholesterol levels and heart disease. “The New York City ban on trans fats applies only to restaurant foods, not grocery products. It is also restricted to those trans fats that are artificial in

nature, as some foods (e.g., dairy products and meat) contain naturally occurring trans fats.” (Lofshult, 2007)

As we will uncover later in this chapter, products sold at grocery outlets must also comply with the transitive fat labeling policy regulated by the Food and Drug Administration (FDA). Grocery stores that serve fresh, hot food to order for takeout, must comply with the ban on transitive fats at each level (NYC and FDA).

Brief History of Artificial Transitive Fatty Acids

Whether transitive fat is worth the effort to ban was, from the prevailing evidence, a very highly debated, controversial, and, inconclusive issue. Today’s era of medical research offers a plethora of evidence warning against artificial trans fat, including empirical research, peer reviewed journal reports, and unfortunately, unhealthy human beings who can attest to the fact that there is a problem with what they are putting into their bodies. The major question so far is; will the ban on transitive fatty acids in the form of partially hydrogenated oils cause more harm than good? Will restaurant cooks and owners resort to the earlier alternatives, i.e., saturated fats? The NYCDOH commissioner Thomas Frieden, quoted below, is not overly concerned about the potentially negative health effects of any substitutable good. “Of course we want people to change to healthier oils, and it’s easy, for most food items, to “convert” to alternatives like canola oil, olive oil, or soy oil. But trans fat is clearly worse than saturated. Even if you switch to suet, you do better.” (Okie, 2007)

The use of partially hydrogenated fats, after their introduction in the early 20th century, experienced accelerated usage in the 1960s, 1970s, and 1980s as food producers responded to public health recommendations to move away from animal fats and tropical oils. At the time,

partially hydrogenated fats seemed to be a good alternative, as mentioned earlier, particularly because of their stability, cost, availability, and functionality.

The post World War II period ushered in an era of pre-packaged foods, longer shelf life, and a health warning against the uses of animal fats and tropical oils. However, the data regarding transitive fat and the use of partially hydrogenated oils, and its potential to cause cardiovascular health disease was limited in the 1950's. At the time, the use of partially hydrogenated fats seemed to be a good alternative, particularly because of their stability, cost, availability, and functionality. Thus, a spike in the use of partially hydrogenated fats occurred over a period of 3 decades, which included the 1960s, 1970s, and 1980s. Food producers followed suit and responded to public health recommendations to move away from animal fats and tropical oils.

Even up to the 1990s, limited data were available on the health effects of transitive fatty acids, and the data available were often contradictory. Between 1960 and 1990, a number of additional studies were published, however, with inconsistent results.

Eckel, et al (2006), explain the variability in the data:

“This variability is likely attributable to differences in the background diets, starting fatty acid profile of the test oil, differences in the degree and type of hydrogenation, and less than-optimal comparison fats. For example, an article published in 1957³ found no significant effect between coconut oil (iodine value 9) and hydrogenated coconut oil (iodine value 5.2) on plasma cholesterol levels of 9 healthy males, probably because, independently of hydrogenation, the fat was composed of predominantly saturated fatty acids. (Iodine value is a measure of the total number of double bonds

³ Malmros H, Wigand G. The effect on serum cholesterol of diets containing different fats.

present in fats and oils. It is generally expressed in terms of number of grams of iodine that will react with the double bonds in 100 g of fats and oils.) In this same study, researchers reported that compared with coconut oil, the hydrogenated whale oil (iodine value 83) was similar in its effect on plasma cholesterol levels, whereas the nonhydrogenated whale oil (iodine value 118) was found to be hypocholesterolemic.”

One year later, researchers reported that within the context of a 35% butterfat diet, there was no significant difference between supplemental corn oil and hydrogenated corn oil.⁴ Keep in mind, hydrogenated corn oil is synonymous with partially hydrogenated corn oil.

However, not until the early 1990’s were medical researchers fully aware of the dangers associated with the uses of partially hydrogenated fats, ie., trans fats. Our consumption of fats and oils includes a combination of several fatty acids we consume on a regular basis. “No fat or oil contains only 1 type of fatty acid. Saturated fatty acids are more stable than polyunsaturated and monounsaturated fatty acids. This stability is important in terms of the shelf life of packaged foods and the retardation of the rancidity of frying oils.” (Eckel, Borra, Yin-Piazza, 2006)

The Process of Hydrogenation – To Create Artificial Trans Fat

Mayo Clinic researchers, as well as other chemists in the industry, have concluded that trans or transitive fat(s) is actually added to vegetable oil through a process called, hydrogenation.

Eckel, et al, (2006) describe the history of Hydrogenation:

“The process of hydrogenation was first discovered around the turn of the 20century by French chemist Paul Sabatier using a nickel catalyst. Shortly after, German chemist Wilhelm Normann developed a hydrogenation process using hydrogen gas.

⁴ Beveridge JM, Connel WF, Mayer GA, Haust HL. Plant sterols, degree of unsaturation, and hypocholesterolemic action of certain fats.

Modifications in the processing and formulation of hydrogenated fats continued through the mid-20th century. It was the partial hydrogenation of fats that introduced *trans* fatty acids (or *trans* fats) into fats of vegetable origin.” (Eckel, Borra, Yin-Piazza, 2006)

Hydrogenation is a classification of chemical reactions that result in the creation of hydrogen or (H₂) to unsaturated organic compounds. Unsaturated fats contain one double-covalent bond, yielding only a small number of hydrogen atoms. Unsaturated fat, tends to be relatively unstable, and in a liquid state at room temperatures, as the amount of Hydrogen on the cell is minimal and easily breaks down when exposed to heat. Saturated fat, on the other hand, contains multiple double covalent bonds, yielding a large number of Hydrogen atoms, which saturate the cell. At room temperature, saturated fat, such as butter, lard, etc. is solid, and will eventually begin to melt as a function of time and temperature.

Hydrogen is the atom that makes the fat cell “saturated”. Referring back to the process of Hydrogenation, organic compounds contain covalent carbon-hydrogen (C-H) bonds. Everyday examples of organic compounds include carbohydrates, enzymes, hormones, lipids, fatty acids, neurotransmitters, proteins, amino acids, vitamins, fats and oils. Therefore, the process of adding monounsaturated fat to these organic compounds is the process of Hydrogenation, or the creation of artificial transitive fat. The most common example of the artificial transitive fat carrying ingredient is the partially hydrogenated vegetable oil, generally used for frying and baking goods such as pizza dough, cookies, and crackers. Examples of products that benefit from a longer shelf life due to transitive fats include manufacturer pre-made blends, such as pancake and chocolate mix. As mentioned earlier, these are exempt from the NYC ban.

“A 1999 study⁵ found that partial hydrogenation had a linear, positive relationship with LDL cholesterol levels in that increasing dietary intake of *trans* fatty acids increased the levels of LDL cholesterol.” (Eckel, Borra, Yin-Piazza, 2006)

In contrast, HDL cholesterol levels remained relatively constant with increasing hydrogenation and decreased only with the highest level of hydrogenation, resulting in the least favorable total-to-HDL-cholesterol ratio. “A recent meta-analysis of available data found that a 2% increase in energy intake from *trans* fatty acids was associated with a 23% increase in the incidence of coronary heart disease. (Eckel, Borra, Yin-Piazza, 2006)

As mentioned by Eckel, et al (2006), a 2% increase in energy, or kcal intake of trans fat is associated with a 23% increase in the incidence of coronary heart disease. There are 9 kcal’s in 1 gram of fat, and 4 kcal’s in 1 gram of protein and carbohydrate, respectively. Therefore, 9 kcal’s worth of trans fat would equate to 1 gram of trans fat, which is approximate to (1%) of 900 kcal’s, or roughly 40% of the average daily caloric intake of 2000 calories. A two percent increase, which would be less than 2 grams of transitive fat, added to this diet would raise the incidence of heart disease by 23%! Certainly, the implication with regard to the labeling law is clear. If, a 2% increase is achievable by raising the transitive fat intake by less than 0.5 grams, then, the lack of transparency and disclosure with regard to the labeling law could jeopardize the myocardial health of the consumer. This is not to mention the associated dangers of triglyceride and saturated fat levels in the blood, and the “hidden” calories from fat. Triglycerides are yet another type of fat found in your blood. High triglyceride level(s) may contribute to hardening of the arteries (atherosclerosis) including thickening of the artery walls. Either would increase the

⁵ Lichtenstein AH, Ausman LM, Jalbert SM, Schaefer EJ. Effects of different forms of dietary hydrogenated fats on serum lipoprotein cholesterol levels.

incidence of stroke, heart attack and/or heart disease. Lp(a) lipoprotein is a distinct type of LDL cholesterol found in varying levels in your blood, and is also dependent on your genetic makeup. It's unclear how high levels of Lp(a), independent of other cholesterol levels, increase your risk of heart disease, as more research is needed. To this point, the best combination of advice is to keep arterial wall inflammation low while monitoring the intake of transitive fats, saturated fats and limiting their intake to less than 10% of the total daily caloric consumption. For instance the AHA recommends “a dietary pattern that keeps intake of *trans* fats and saturated fats as low as possible (with less than 10 percent of daily calories coming from *trans* fats and saturated fats combined), as both of these are associated with an increased risk of heart disease.” (American Heart Association, Inc, 2006)

The Trans Fat Ban, Product Labeling, and the Food Manufacturing/Service Industry

The NYC ban, therefore, is focused only on the removal of chemically engineered and artificial transitive fats within meals. The naturally occurring transitive fat, discussed earlier in dairy and meat products, would still be available, ostensibly, at a concentration above 0.5 grams within these restaurants and eateries. In restaurants that serve copious amounts of meat and dairy products, the relevance and effectiveness of the ban would not be nearly as effective, as say, within a bakery or pizzeria. This is a tremendous cause for concern, as this legislation, specifically, does not require that restaurants actually test the meat, to measure for transitive fat levels and content. The health implication here is that the advantages or “gains” would offset the disadvantages, or “losses”.

Lofshult (2007) also states that there is a LINK between transitive fat and heightened cholesterol levels and heart disease. This “link” does not seem to offer proper evidence to support a city-wide ban. As stated previously, since dairy products and meats naturally contain

transitive fats, would the hamburger and milkshake consumed still bring an unwilling consumer into the danger zone? Say that a large percentage of the patrons to these restaurants consume the meat for sustenance and some form of dairy product as a beverage. Is the ban effective in the prevention of heart disease? Did the NYCDOH act prematurely before viewing all the evidence, i.e., is ingredients containing transitive fats the best way to reduce coronary heart disease? Is the effectiveness of this ban a function of the labeling law as well?

A counter viewpoint to Lofshult, is offered from health researchers at Men's Health magazine emphasize that one of the candid issues behind obesity is the fact that many chains that provide 33% of all restaurant meals, according to the NYSDOH, distort the fat and calorie counts of their own menu items. The researchers go on to say that the fast food chains including mainstream restaurants, commonly combat against attempts to reveal, for instance what, is REALLY being served within McDonalds Big Mac or Taco Bells Taco Supreme. The fast food and restaurant industry pays lobbyists to lobby relentlessly to keep its dietary secrets. Indeed, this particular law is on the industry's side.

The Nutrition Labeling and Education Act of 1990, in all respects, establish the precedence to grant impunity to restaurants from all nutritional liability to the American public. This legislation lacks a cohesive requirement for fast-food or chain restaurants to provide calorie, fat, or sodium information for any of their menu items, unless they specifically describe the items as "low sodium" or "low fat."

To understand just what these restaurants are trying to hide and distort from the American public, Goulding & Zincenzenko (2008) offered the following:

“Through scientific testing, consultations with nutrition experts, and good old-fashioned snooping, we uncovered some of the secrets these mega-restaurateurs have been

keeping. Sit-down chain restaurants don't want you to know that their food is actually considerably worse for you than the often-maligned fast-food fare. In fact, our menu analysis of 24 national chains revealed that the average entree at a sit-down restaurant contains 867 calories, compared with 522 calories in the average fast-food entree. And that's before appetizers, sides, or desserts-selections that can easily double your total calorie intake.”

From the data supplied by the Men’s Health researchers we can derive that 33% of all restaurant meals were consumed by unassuming patron(s) that were unaware of the true fat and calorie content of their order(s). The morbid and costly implication for the health care industry is that 67% of the patrons to these restaurants do not know how many calories from fat, triglycerides, total fat, or transitive fats they are consuming. The likelihood could be quite high, eating within these restaurants, that the patron is borderline hypertensive, diabetic, or has a major arterial wall blockage rate of 70% or higher, and is unaware that the food consumed is likely understating the actual fat and caloric content. This is misleading to one’s rational ability to make a decision with regard to their health.

As a result of this obscurity, national restaurant chains as well as the federal government joined the transitive fat, transparency-in-food labeling initiative. Initiating in 2006, the U.S. Food and Drug Administration required food labels to begin listing trans fat information. Subsequently, chains such as **Kentucky Fried Chicken**, **Taco Bell**, **Wendy's**, **Ruby Tuesdays** and **Chili's** have announced intentions to begin using alternatives to trans fat. Again, according to the publication, **Health Effects of Trans Fatty Acids**, “Without greater availability of information on the *trans* fatty acid content of foods, health-conscious consumers are likely to be particularly misled by claims of “low saturated fat” and “cooked in vegetable oil, as those

products may contain up to 35% *trans* fatty acids.” (Ascherio, Willett, 1997) Proper advice regarding dietary intake should specifically aim to reduce the amount of both saturated and trans fatty acids ingested.

A good method to start informing the public of calorie and transitive fat content is by adding transitive fat information to Nutrition Facts Labels on packaged foods. This certainly is a good way to start providing consumers with the knowledge needed to make truly informed heart healthy, and overall healthy food choices. To continue consumers must understand that just because they do not actually read transitive fat on a product label, that they should assume the product is transitive fat free. For example, products with less than 0.5 grams of transitive fat can still claim to have 0 grams of transitive fat on their label. In reality, it can contain anywhere from 0.1 to 0.4 grams of transitive fat.

Eckel, et al, (2006) describe the situation as highly misleading, as consumers may be ingesting upwards of 10% of their daily calories from so-called, fat free foods:

“So just like with ‘fat-free’ foods, multiple servings of ‘zero *trans* fat’ and ‘zero saturated fat’ products can actually add up to more than 10 percent of daily calories. We need to continue to work on expanding consumer access to this information in all of these locations so consumers can make healthy decisions in all situations.”

This next quotation from the Mayo Clinic Staff (2006) further reinforces the masking effect of improper food labeling:

“In the United States, the labeling requirement has a caveat. Trans fat that amounts to less than 0.5 grams per serving can be listed as 0 grams trans fat on the food label. Though that's a small amount of trans fat, if you eat multiple servings of foods with less than 0.5 grams of trans fat, you could exceed recommended limits.”

The most alarming fact with regard to the labeling requirement certainly is the obscurity in how much transitive fat is actually within a meal. This is important to the NYC ban, since many who do patronize these restaurants and eateries, are from out of town or country. The regulation of their health, including the adaptation of the body to the indigenous food and meals that these individuals were raised on, may be highly sensitive to, as much as, a 0.4 gram increase per meal to their daily nutritional intake. Again, the implication here is federal and municipal legislation still lacks proper regulation and oversight to ensure that the proper objective, which is to limit transitive fat intake to less than half a gram per serving or per meal, is met. This essentially does regress to the lack of transparency in the national labeling laws as well as the municipal labeling laws, which according to the AHA, while on a national level, is not as effective as the FDA can make it to be.

6 Key Provisions Currently in Place to Regulate the U.S. Food and Restaurant Industry

Speaking back in reference to the point made by the Men's Health researchers, the claim that **The Nutrition Labeling and Education Act of 1990** is on the side of the restaurant industry is worth further investigation.

November 8th, 1990 marked the day in history, George H. W. Bush signed into law, **The Nutrition Labeling and Education Act**. This ostensibly progressive reform act containing these key provisions set the precedent for further regulation through legislation from regulatory agencies:

- The key first provision requires each food manufacturer to disclose the amount of fat (saturated and unsaturated), as well as the level of cholesterol, sodium, sugar, fiber, protein, and carbohydrate content in their products.

- The second key provision **requires that the top 20 selling fruits, vegetables, fish and shellfish are labeled**. However, the labeling need not be on the actual commodity. The law states that the retailers may provide this information in a single location in their stores.
- The third key provision exempts meat, poultry, egg products, **food sold in restaurants and prepared at the food counter in grocery stores**, infant formula, foods sold in bulk, foods containing marginal amounts of nutrients as well as foods sold by retailers with total sales, not revenues, of < \$500,000.
- The fourth key provision requires the Food and Drug Administration (FDA) **to establish standards and parameters**, including definitions to food descriptors, such as “low,” “lean,” “lite,” “reduced,” etc.
- The fifth key provision **establishes a standard for allowing health claims on foods**, if the claims if they are based on sound empirical evidence, are truthful, accurate, and not, in any way, misleading. This provision also allows for third-party references or endorsements.
- The sixth key provision requires the United States Department of Agriculture (**USDA**) and the U.S. Department of Health and Human Services (**HHS**) **to publish dietary guidelines every five years**.

Further Domestic Regulation – USDA, FDA, HHS

Further regulation via legislation occurred on January 6th, 1993, when the FDA and the United States Department of Agriculture (USDA), each regulatory agencies, issued corresponding regulations that control the format (display) and content of the nutrition labels on

foods, including, processed meats and poultry products. This new food label, on all products, enables consumers to make better decisions with regard to the foods they purchase.

Then on May 27th of 2000, the USDA along with the HHS required nutrition labeling for all ground or chopped meat, including meat and poultry products. This most recent legislation proposed by the FDA on January 1st of 2006, required that the Nutritional Facts are labeled on packaged food products, including, how many grams of transitive fat are contained within one serving of the product.

The American Heart Association (AHA), made this statement with regard to the FDA regulation, “The American Heart Association commends the FDA for taking this important step but feels more work is needed to inform consumers about which products do and do not contain *trans* fats. For instance, some companies who petitioned the FDA were granted an extension to the deadline, meaning their products would not have *trans* fat information on their labels as of Jan. 1.” (American Heart Association, Inc, 2006)

In this instance corporate appeals is expected and full compliance by the target date is an enviable goal. The AHA, in this instance, is not assisting in the collaboration between various regulatory agencies, municipal governments, researchers, and medical institutions. The AHA appears to be more of a “lone gun” on this topic. However, the divisive nature of that statement may also indicate that the AHA is implying that the FDA is attempting to assist the corporate interests while ostensibly protecting the end consumer.

Further Evidence against Trans Fat

The surmounting evidence against transitive fat is one that has roughly been in development for 18 or so years. Legislation and regulatory pressures on the restaurant industry has led to the enactment of these laws to help further prevent the degradation of human health at the hand of

transitive fat. Subsequent addendums to prevailing legislation as well as new legislation can further monitor the prevalence of contracting debilitating cardiovascular diseases since the precedent was established. These policies may expand to not only include transitive fat. They may limit the amount of sodium and calories from fat, served per meal within restaurants as well. Such action may further establish the presence of “Gestapo” regulations, designed to enforce inhabitants within its policy limits into a socialized, or government regulated state of existence. However, this draconian prediction cannot be made without a more precise explanation as to exactly how trans fat effects the homeostatic environment (all else remaining equal) in the body.

Researchers at the Mayo Clinic published an article that essentially says trans fat is responsible for raising the Low-density lipoprotein (LDL) cholesterol levels in the blood, while, lowering the High-density lipoprotein (HDL) levels. It is this duo, they say, that causes a marked increase in the probability for the onset of the most prolific killer, heart disease.

Mayo Clinic (2006):

“When it comes to fat, trans fat is considered by some doctors to be the worst of them all because of its double-barreled impact on your cholesterol levels. Unlike other fats, trans fat — also called trans fatty acids — both raises your "bad" (LDL) cholesterol and lowers your "good" (HDL) cholesterol. A high LDL cholesterol level in combination with a low HDL cholesterol level significantly increases your risk of heart disease, the leading killer of men and women.”

Mayo Clinic Staff (2006) reinforce the progressive nature of the 2006 FDA labeling law (listing trans fat in grams on nutritional labels), which foreign nations had adopted to some degree:

“Since January 2006, manufacturers in the United States have been required to list trans

fat content on nutrition labels. Manufacturers in other countries have taken similar steps. As a result, some companies have changed their manufacturing process to use little or no trans fat.”

The two-pronged initiative, stated earlier, does aim for transparency in domestic labeling. This labeling initiative has extended to influence how manufacturers label their products as well. To continue, the U.S based labeling initiative asks that restaurants clearly state the number of calories contained within each serving of the meal. However, this does not inform the consumer as the amount of transitive fat grams (0.5 etc) within the serving. This lack of clarity to the consumer is detrimental to their ability in making informed decisions with regard to the number of servings allowed. Simply stated, a patron within a restaurant that is consuming a meal with a REDUCED amount of transitive fat, for instance, 0.3 grams/serving, now feels that it is safe to consume twice the amount as before. This puts his transitive fat ingestion, specifically for this meal, at 0.6 grams, which is, ostensibly, above the original goal of having the patron consume less than 0.5 grams per sitting. Certainly, eliminating partially hydrogenated vegetable oils and other such ingredients (artificially derived trans fat) will eliminate trans fats all together. However, the verdict is still out on whether the reduction/elimination of transitive fat is, in fact, medical panacea for cardiovascular disease. Substitute goods could contain more of the other undesirable ingredients, associated with obesity, diabetes, etc.

Up to this point, the research has isolated artificially derived transitive fat as the culprit to blame for increased risk of cardiovascular disease. However, researchers at the University of Reading published a study with regard to non artificially produced, or naturally occurring trans fats, that concludes, “Full-fat dairy products and naturally derived trans fatty acid consumption did not cause significant changes in cardiovascular disease risk variables.” (Biotech Law

Weekly, 2006). Furthermore, "increased consumption of full- fat dairy products and naturally derived trans fatty acids did not cause significant changes in cardiovascular disease risk variables, as may be expected on the basis of current health recommendations. Dairy products naturally enriched with cis-9,trans-11 CLA and trans- 11 18:1 do not appear to have a significant effect on the blood lipid profile." (Tricon, 2006)

What the University of Reading researchers did is to isolate the TYPE of transitive fat that is of primary concern to the medical community. This study confirms the hypothesis that artificially produced transitive fat IS the leading cause of cardiovascular disease, and not the naturally occurring transitive fats that exists naturally. "Consumption of naturally occurring trans fatty acids or TFAs has not been associated with higher CHD risk." (Mozaffarian et al., 2006) This relatively new information contradicts the notion that consumption of non artificial transitive fatty acids can cause as much damage as artificial transitive fat consumption. The assumption of consuming meat products with the idea that it would cause a significant increase in the probability of developing cardiovascular disease, due to its concentration of transitive fats, is erroneous; Keep in mind, however, that meat products are high in saturated fats. "Beware of bad fats. Cut back on saturated fat (found in red meat and full-fat dairy foods)." (Harvard Heart Letter, 2008)

Another advocate of avoiding artificial transitive fats and limiting the intake of saturated fats is Dr. Walter Willett, a member of the Harvard Heart Letter editorial board and who has been quite vocal as an advocate in banning transitive fat. Along with his colleagues at the Harvard School of Public Health, he has expressed contempt for transitive fat and quantified the amount of lives lost per year due to trans fat. Dr. Willett and his colleagues had estimated that "replacing **trans** fat with healthier unsaturated fats could save 30,000 or more lives a year." (Cowley,

Markt, Tucker, 2006) Dr. Willett goes on to state that the public can improve their overall health by avoiding added trans fat intake, as well as limiting foods that contain sugar, refined starch and saturated fat. The conclusion here is, “This arterial assault translates into higher rates of heart disease.” (Faculty, Harvard School of Public Health)

Willett (2006) estimates (very conservatively) that if all New Yorkers replace all sources of artificial transitive fat, at least 500 deaths from heart disease would be prevented each year in New York City. This is more than the number of people killed annually in motor vehicle crashes. Based on long-term studies (Willett 2006), the number of preventable deaths may be many times higher.

Dr. Willet and his fellow colleagues feel that the removal of transitive fat alone is really not enough. However, the removal of this toxic substance, which has no place in food, will have a large enough impact to actually save more lives than lost in automobile accidents per year. This is to say, in keeping a somewhat myopic viewpoint on this issue, that targeting the removal of trans fats will save more lives per year than if the ban were not to be enforced, if one were to only compare mortality rates associated to trans fat intake with automobile accidents. To continue, his estimation of 30,000 lives saved, can in fact, have a large portion of its concentration with indignant and uninsured/underinsured populations. If so, this policy could potentially save public hospitals plenty in the long run, as the number of diagnoses for cardiovascular disease in poorer neighborhoods should, in theory, show a decline over time. Certainly, the policy implications in limiting cardiovascular disease amongst the indignant, uninsured and underinsured would save counties, the state and the federal government, hundreds of millions, if not billions over time.

Extrapolating a theory from his estimation brings to light a good point. Regional and local policy can address the most cost effective and results-driven component of health conditions that afflict the indignant at a higher rate than everyone else, with regard to the health of a specific population described by their income demographic information. For instance, legislators in areas such as Troy, NY, could institute a ban on transitive fat, which in terms of cardiovascular disease, should statistically show the greatest net benefit amongst this income demographic. Secondly, the ban would benefit the area public hospitals, which may suffer a loss of revenue due to the lack of reimbursement for all services rendered to the uninsured, underinsured, low-income patient.

Therefore, from the statements of Dr. Willett and his colleagues, we may conclude that, this is, in disguise, a more preventative measure aimed toward health regulation, to reduce the likelihood of costly invasive surgical procedures associated with the uses of trans fat in area hospitals. The influence that science has on the politics with regard to the overall regulatory framework of the global food manufacturing industry is strong. We will see that many nations across the globe have defined transitive fatty acids, at least, as an element that must be removed from household cooking ingredients.

In support of Dr. Willett and his colleague's findings, a group working with the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) viewed the health effects of transitive fatty acids and concluded the following; "high intakes of *trans* fatty acids are undesirable and their consumption should be reduced". (FAO, 1994) "Although the US food industry has resisted change;" (Kris-Etherton, 1995)

The researchers had also stated that transitive fats also contribute to the rate of heart attacks, by implying that there is a link between transitive fat levels in the blood and the potential for a

stroke. “If plaques tear or rupture, a blood clot may form — blocking the flow of blood or breaking free and plugging an artery downstream. If blood flow to part of your heart stops, you'll have a heart attack. If blood flow to part of your brain stops, a stroke occurs.” (Mayo Clinic Staff, 2006) Therefore, the number of deaths attributed to stroke, and the number of patients that suffered a stroke is a function of high levels of artificial transitive fat intake. As we can see, transitive fat, coupled with saturated fats, cholesterol and other types of fats are of extreme concern to cardiovascular and mental well-being, as they increase the LDL and lower HDL levels in the bloodstream. Trans fat and its’ effect on cholesterol is of primary concern to doctors, yet, trans fat has also shown to increase the level of other harmful fats, cholesterols as well as contribute to inflammation of the arterial walls. “A high LDL cholesterol level is a major risk factor for heart disease. If your LDL is too high, over time, it can cause atherosclerosis, a dangerous accumulation of fatty deposits on the walls of your arteries. These deposits — called plaques — can reduce blood flow through your arteries.” (Mayo Clinic Staff, 2006)

My humble opinion so far, derived from the readings undertaken to formulate this study, is that the INFLAMMATION of the arteries and arterial walls, respectively, is what causes fatty deposits to adhere to the wall, causing fatty blockages and hence, establishing a situation where the wall may become partially blocked and lead to a myocardial infarction (heart attack).

The Mayo Clinic (2006) research points to transitive fat its perceived relationship to arterial wall inflammation:

“Trans fat may increase inflammation, which is a process by which your body responds to injury. It's thought that inflammation plays a key role in the formation of fatty blockages in heart blood vessels. Trans fat appears to damage the cells lining blood

vessels, leading to inflammation.”

Another indicator of potential Coronary Heart Disease or CHD is a high level of serum cholesterol in the blood. Transitive fat intake ostensibly raises the intake of LDL, which in turn, lowers the HDL in the blood. Partial hydrogenation and the resulting transitive fatty acids have a negative effect on serum cholesterol levels. This scientific conclusion bears out consistently in multiple research studies conducted throughout the 1990s.

With another interesting viewpoint, and method of measuring the risks associated with transitive fat, researchers with the ongoing Nurses' Health Study measured the amount of trans fat stored in red blood cells.

Harvard Health Publications (2007) conducted a study sample size of 32,000 middle-aged women and found that 166 of them suffered myocardial infarctions or died of CHF during a six year period. These researchers found, that generally, more transitive fat contained within red blood cells, the greater the probability of suffering from cardiac arrest, or a stroke. This study, published in the April 10, 2007 *Circulation*, strongly supports the set of recommendations made by the Institute of Medicine and the USDA's Dietary Guidelines, advising Americans to try and cut back, or if possible, completely remove trans fats from the diet. Therefore, if the industry does its part and removes artificial transitive fat from the food supply then Americans, as well as the rest of the world, will only have exposure to naturally occurring trans fats, in the form of animal fats from meats and cheeses. The elimination of artificial transitive fat while holding at least equal the amount of natural transitive fats could prevent up to an estimated 264,000 heart attack episodes, as well as cardiac related deaths each year in the United States.

The Nurses' Health Study found that 1 out of about every 193 middle-aged women in the study had or died of heart attacks, or heart disease, respectively, during a period of six years.

The 2006 census estimates the population of metro NYC to be about 19mm citizens. Since this study has potential applications to all Americans - according to the Harvard Heart Letter, one may state that one out of every 98,445 members of the population within NYC is at risk of either a heart attack or the onset of heart disease. The interpretation here may imply that one out of the same number of patrons to restaurants within NYC is at risk for cardiovascular disease. The prevention of 264,000 deaths by way of heart attacks should increase in number as people “phase out” trans fats and saturated fats all together. We now know that the preventative function of this legislation is to, at least, prevent 264,000 deaths via cardiovascular attacks each year. The interesting statistic here is to estimate, perhaps by regression, how many of the 264,000 preventative deaths were within the lower income population, and therefore, potentially attributable to impoverished living conditions.

The Regional, National and Global Politics and Economics involving Trans Fat & Public Health

The following is a synopsis of the transcript from a conference on transitive fats, with the primary focus on, *Understanding the Complexity of Trans Fatty Acid Reduction in the American Diet*. The results of the empirical studies used by the conference members were from a collaborative effort with researchers from the American Heart Association Trans Fat Conference Planning Group.

A 2-day forum was convened to identify and discuss the status and future implications in the reduction of transitive fatty acids without increasing saturated fats in the food supply. This is to occur while maintaining functionality and consumer acceptance of packaged, processed, and prepared foods. Attendees at the conference were from all facets of the industry, representatives from the agriculture, oilseed and oil processing, food manufacturing, food service, government,

food technology, and health and nutrition disciplines all convened.

The conference consisted of educational presentations, which unveiled the food science behind transitive fatty acid technology, the health science of dietary fatty acids, alternatives to transitive fatty acids, and the use of substitutes or alternatives in food manufacturing and food service. The reduction of transitive fatty acids in the food supply is a very complex issue that involves many interdependent and interrelated stakeholders, as were represented at the conference. Of importance within the document is the re-focus to pandemic solutions aimed to reduce the overall consumption of transitive fatty acids. However, their removal must undergo careful consideration for both the intended and unintended consequences related to nutrition and public health. In this case, the unintended consequence(s) of using fats and oils high in saturated fats instead of the healthier unsaturated fats is of greatest concern. Many different options of alternative oils and fats to replace transitive fatty acids are available or in development. According to members present at the conference, decisions to the use of these alternatives need to consider their availability, as well as their health effects, research and development investments, reformulated food quality and taste, supply-chain management, operational modifications, consumer acceptance, and cost. The conference demonstrated the value and importance of collaboration between the food industry and health and nutrition professionals. This represents a macro effort amongst all global stakeholders, all whom do affect the food industry, and ultimately, the amount of transitive fat contained within ALL purchasable food items.

“The major European margarine and oil manufacturers have acknowledged the adverse effects of *trans* fat and have eliminated or greatly reduced amounts in margarines.” (Katan MB; Lancet 1995,) “From the changes in margarine alone, it was estimated that rates for CAD would

be reduced by 5%. If such changes were made in the United States, this would reduce premature deaths by $\approx 25\,000/\text{yr.}$ ” (Ascherio, Willett, 1997)

Essentially, this conference established the forum to engage in designing a strategic plan, an initiative that will reduce and eliminate the transitive fat while not increasing the saturated fat content of the said food. Now, all key members of these companies, whom are involved in the supply chain, supposedly, convened at this meeting. Certainly, this appears to be a global initiative, a full phase out of artificial trans fats from all menu’s and is to include all manufactured packaged goods for sale. This macro policy will induce change while assisting in sustaining the progress achieved through the enactment of state and local legislation. The policy formulated through this legislation essentially, is a product of the function “grassroots initiative” from medical experts and health advocates, which has forced upon legislators to consider changing public health policy. The adjustment of private industry to policies that reflect social change has changed the macro process of how processed foods is made and will, in time, eliminate all artificially manufactured trans fat in all associated products, altogether.

Efforts to ban transitive fat at not only restaurants, but within prepackaged foods sold globally, is gaining momentum across the country and the world. From county and local community initiatives to sweeping reforms at the state, federal levels and in international policy, examples of counties that are currently looking into the transitive fat ban are, Westchester County, NY and Nassau County, NY, among others. “In Australia, Norway, Finland and The Netherlands, TFA’s have been voluntarily withdrawn from many popular oil and margarine brands, perhaps as a result of international trading pressures”. (Aro 2005; Baylin et al. 2007).

Krisberg (2007) further explains the most recent reforms, sweeping the nation, in the following statement:

“Proposals to phase out trans fat from restaurants and require food establishments to inform consumers as to the trans fat content of their products are under consideration in dozens of U.S. cities and states, including Connecticut, Maryland, Cleveland, Chicago, Los Angeles and Boca Raton, Fla. Most recently, Philadelphia's City Council voted in early February to bar its restaurants from using trans fat.”

Empirical evidence has proven a relationship to the onset of heart disease through the ingestion of artificial transitive fat. Legislators at the municipal and state levels across the country have made it a point to reduce the overall amount of transitive fats contained within their restaurant meals. However, the wisest municipality will attempt a more proactive approach, which is to conceptualize the issue, meaning that the prevention of diabetes, hypertension, and diabetes mellitus (Type I and II), would assist in addressing a much larger issue within all age groups, sexes, and ethnicities within our population, Obesity.

Boston is a proponent of this proactive, preventative approach through policy. Legislators here envision the ban on transitive fat as part of a larger campaign to address obesity, congestive heart disease and diabetes. Currently, a proposal to ban transitive fat in Boston restaurants is actively under consideration as the governing board that oversees the commission has held two meetings on transitive fat regulations. Boston's stance on transitive fat is directly a result of New York City's actions, as this provided encouragement for Boston health officials to consider regulatory action. The city has commenced working with restaurants to eliminate transitive fat as part of its Best Bites campaign, a restaurant program aimed at fighting obesity. The governing board overseeing the commission and the mayor, expressed concern about the health risks of obesity and poor nutrition in Boston, by indicating a desire to continue to do more innovative and aggressive activities, needed to curb these health risks among the at-risk population.

Again, the movement against transitive fat is not limited to just cities towns, and Metropolitan Statistical Areas (MSA's). In Miami-Dade County, Fla., the campaign to ban artificial transitive fat from restaurants is in its infancy, a few months old, but has tremendous momentum. The Bantransfatin miami.com campaign was founded by nutritionist and author Ronni Litz Julien, who said New York City's success encouraged her to bring Miami onboard. "Julien said she is already beginning to slowly build support with county policy-makers as well as Miami's mayor, all of whom have already received advocacy packets from the campaign on why Miami-Dade should ban trans fat." (Krisberg, 2006) "The city of Chicago is weighing its own regulations on restaurant trans fat. Canada, the first nation to mandate trans-fat labeling, may follow with a nationwide ban. To date, the only country to enact a ban is Denmark, which two years ago outlawed foods containing more than 2% trans fats." (Tufts University Health & Nutrition Letter, 2006)

NYC has really established itself as a model, thus far, to cities like Boston, Miami and Chicago, and ostensibly, has caused sweeping health policy changes to sovereign nations like Canada and Denmark. The data against trans fat is international in scope and is being phased out en masse'. This also appears to be a major decision regarding economic and social growth patterns within developing economies (local, state, national). To interpret this is to understand that there is a somewhat fixed and limited natural food supply. The artificially derived, processed and stored foods must be safer for mass human consumption since the current health care delivery system is seemingly in need of support from health care policy experts, legislators and medical scientists.

Literature Review – Conclusion

We may conclude that patrons to restaurants have little knowledge of what exactly transitive fat is or the potential implication of its consumption to their overall health and well-being. The assumption from the consumers of transitive fats, in the early 1990's, was that the labeling was precise and not misleading. Therefore, transitive fats were not too bad as they were not in abundance within the manufactured cookies, cakes and snack foods due to the oils used within the restaurants that were being ingested at the time. We now know this to be incorrect as the real amount of transitive fat within these baked goods was horribly understated.

In my opinion, the real implication is this. Since its inception, TFA's presumably have forced the restructuring of human DNA in all who consumed it over the course of generations. The long-term affect to human biological development may not be known for generations, as potential mutations to the human genome, directly attributed to the intake of transitive fats, may cause a predisposition for cardiovascular disease in certain populations⁶. Problems while in the Developmental stage in the chromosomal development is also potentially linked to TFA intake⁷. All we really know is that removing TFA's to a point below the maximum allowable threshold (which is the amount of TFA available and where consumption habits in the population correlate to increased incident of MI or CHD) does prevent the onset of cardiovascular health related issues.

Regulatory agencies make it their business to ensure that the legislation passed is enforced at the ground level. Although there is some lag time, business owners, food manufacturers and food chemists have all realized that this ban will not go away and have subsequently prepared for

⁶ <http://www.vitaminstuff.com/articles/healthyfoods/articles-healthyfoods-3.html>

⁷ <http://www.puristat.com/standardamericandiet/transfats.aspx>

a future void of using transitive fats. The fast food industry & some progressive restaurants, with persistent efforts from regulators, have complied with the law before the deadline in an attempt to smooth the transition process.

The future of the restaurant industry, to the perspective of the business owner, is in the use of substitutes that are free of transitive fats. The control in the production of artificial transitive fatty acids has fallen directly on the manufacturer, who in many instances, has willfully agreed to use substitute ingredients or to remake their formula to reduce artificial transitive fat usage in processed and baked goods. Advances in food technology needed to create new substitute oils and shortenings are known to the business owners, as indicated by NYCDOH commissioner Thomas Freiden. The commissioner tells an anecdotal story of eating from a box containing a dozen, freshly made, transitive fat free doughnuts. I will paraphrase the commissioner by stating that his response to what he tasted was – simply delicious. The choices in substitutes to select from are plentiful, and there for the restaurant owners to peruse and try out. Other restaurant owners had indicated that they are happy with the transition from partially hydrogenated oils to their new choices. One owner switched to soybean oil and did not miss a beat in the operation of his business. Also, the NYC initiated ban has become international in scope, with Australia, Finland, the Netherlands and Norway voluntarily withdrawing the use of transitive fats from oils and margarines. The Miami-Dade County MSA has activists that brought about change at the grassroots level to bring about awareness as to why transitive fat should be banned. Other cities are strongly considering such a ban and have required that restaurants post the amount of transitive fat contained per serving.

However, some questions still remain with the big players in the fast food industry, as distortion between interpretation of the regulation, corporate policy, lobbying practices and

allowable variance in the amount of grams allowed to be reported, continue to undermine efforts to reduce the overall consumption in the population. Tremendous progress has been made, yet, one has to wonder if increased intake of these foods due to one's mindset that they are now "healthier" to consume, will do more harm than good. This seems to be the case with many snacks and baked goods that underwent changes in production for health purposes. Therefore, increases in saturated fats, sugar, and triglycerides may increase the incidence of other forms of CHD or affect other systems of the human body.

The costs and benefits associated with this policy, in the long run, will be positive such that a decrease of CHD in the population will reduce the expensive health care related costs of invasive cardiac surgeries. The research indicates that transitive fats must go even at the opportunity cost of increased amounts of other undesirable fats, cholesterols and sugars. The FDA, HHS, and AHA must remain ubiquitous as regulatory agencies and as providers of health information while working with legislators and public health officials in continuing to look out for the consumer. The overall objective is to have a healthier global society, regardless of whether society at-large, knows they are being protected, and to reduce and keep medical costs amongst at-risk populations at a minimum.

CHAPTER III

C. Methods, Procedures and Measures

Methods:

The population size is essentially all inhabitants of the metro NYC area, including all boroughs, and others who patronize these 24,000 restaurants within these city limits. Therefore, these methods was used; including stratified sampling using proportionate allocation, surveying via the internet, random digit dialing and random yet targeted email invitations to the NYC AOL

online community. A total of 75 random faxes, (using the introduction letter detailed below) was made, to business representing each of the five boroughs (Bronx, Brooklyn, Manhattan, Staten Island, and Queens).

Procedures:

With the Questionpro survey web service, 150 emails were distributed anonymously by Questionpro services, to residents (patron & business owner) within NYC. Fifty of the 150 email addresses represented restaurant patrons. Their email addresses, retrieved via AOL software, remain available to access on the AOL online community service. Questionpro permits the use of an electronic email generator that distributes emails anonymously. 10 emails was sent to residents of all five boroughs. The remainder or 100 emails (20 emails to restaurants within each borough) was sent to restaurant owners. Their email addresses are available on www.metronyc.com. The restaurant section is searchable by a number of categories including by borough and range of menu pricing. The procedure used here was to isolate a list or restaurants by subdividing the entire list into each borough; five emails were then, sent electronically to restaurants in each borough. A total of 100 calls were made, with an even distribution of fifty calls to random house addresses (yahoo white pages) and fifty calls to random restaurants (yahoo yellow pages restaurant section & www.metronyc.com)

The resulting sample population includes **15 aggregate**, usable, business owner survey responses and **17 aggregate**, usable, restaurant patron survey responses. Multiple selections for the question that pertains to the type of restaurant frequented yielded more than one response per survey taker. The survey responses for the former, again, were obtained randomly by selecting restaurants/eateries in the metro NYC area. The survey responses for the latter were also

obtained randomly, from metro NYC. Metro is to mean the five boroughs, and only the five boroughs representing NYC.

The owners of each random eatery/restaurant had logged onto www.questionpro.com. Each responded then participated, in varying degrees, to an online survey for the patron or the business owner. The survey questions specifically target the transition to transitive fat free ingredients. The transitive fat substitutes used by the business owner are listed as multiple choice responses with the category, along with an input box, marked, “other” to specify a response.

The survey contains multiple choice questions that target the following; pre trans fat ban awareness, the type of restaurant most frequented, the visitation rate to these restaurants during the ban, whether or not their dietary habits regarding trans fat have changed, including their knowledge of the labeling law (less than 0.5 grams of trans fat can be labeled as 0 trans fat), their current health (borderline hypertensive, etc.).

To obtain the (benefit) data from the population to create our sample population, (100) random phone calls to home based telephone lines and businesses were made using the yahoo yellow and white page listings for each borough. Voice messages, left on their machine and one case, with the owners wife, indicating to log onto the web to take our survey. These activities yielded many visits but unfortunately, many drop outs in each survey. Random yet targeted emails to residents of NYC, sent to members of the AOL online community, asking to complete the patron survey coupled with more formal efforts to obtain business owner responses, including printing out 40 letters, and randomly picking out restaurants that were not previously phoned, then faxing the request over.

The limitation with the surveys is in the response rate of the business owner and patron in providing feedback using Questionpro software. A poor response rate overall was achieved, which includes a poor response rate to the total cost attributed changing from the use of transitive fatty ingredients. The poor response rate was due to the relative short time frame given to obtain data for this study. However, this approach did avoid major disaster but only due to perseverance, and still the success is only marginal. With more time and funding, low survey response rates could rise by raising the frequency of contacts to both the business owner and patron, by targeted IP selection to working professionals within the surveyed area. A high drop-out rate on the business owner side of the survey is expected. The activation success rate for this survey (opening the link to the survey) is a reflection of the methodology mentioned above. Also, language barriers, reading comprehension, responsiveness of the surveyed, and difficulty in understanding what the question was specifically asking serve as limitations to the study.

The introduction for the survey on questionpro.com:

Measures:

The first question is simply a summation of the responses where patrons provided information about their overall knowledge and/or change in habits (if any) after finding out about the ban on transitive fats. These include questions 7, 8, 9, 10, & 12. A cumulative percentage will be taken of these questions and used as the basis of this answer. The best construct here is patron awareness and is measurable by their answer choices to the aforementioned questions.

The second question is answered by using the same methodology as above, but applied to questions 5, 6, 7, & 8 on the business survey. These questions paint a before and after of business operations, prior and after the announcement and enforcement of the ban. The answer

will be presented as a percentage of respondents that indicated changes to their operations as a function of the ban.

The third question, answered, by simply tabulating the various substitutes used by the respondents, then, investigate to see to what degree the substitutes contain saturated fats, etc.

CHAPTER IV

D.) Findings

Business Owner Survey

This section will display only the relevant results. Please see the appendices for the complete survey result. As to be expected, the completion rates for the surveys were paltry to say the least. The business owner survey was viewed 32 times, started 23 times with 7 total dropouts. The completion rate is 69.57%, which is 16 divided by 23 *100. The aggregate number of attempts to solicit a response, including faxes (40), telephone calls (100), and email (82) is 222.

The most successful question, rendering the greatest number of responses is “What type of restaurant do you own?” and “What business does your business operate in?” each with 15.

The least successful question, rendering the least number of responses (total of 3) is “Over the past ten years, what has been the growth rate in sales, on average, for your business?”

Table 1.1 below shows the individual count, and percentage breakdown of the survey participation.

Table 1.1	Count	Completed / Started	Completed / Viewed	Started / Viewed
Completed	16	72.73%	51.61%	
Started	22			70.97%
Viewed	31			

Therefore, the real completion rate (actual responses/total possible responses) is 16 divided by 222 * 100 or 7.21%.

Table 1.2 below depicts a simple breakdown of the business owner participation per borough. 15 faxes, 20 emails, and 50 phone calls were placed to each borough. The percentage breakdown is representative of the total, countable survey responses and not that of the number of surveys, distributed to business owners.

Table 1.2

Answer	Count	Percent
Manhattan	4	26.67%
Bronx	7	46.67%
Queens	2	13.33%
Brooklyn	1	6.67%
Staten Island	1	6.67%
Total	15	100%

Table 1.3 below shows the responses to the use of artificial transitive fat in the past.

Table 1.3

Has your business, now or in the past, used ingredients that contain artificial transitive fats?		
Answer	Count	Percent
Yes	9	100%
No	0	0%
Total	9	100%

Table 1.4 below shows the level of familiarity with artificial trans-fat ban in NYC.

Table 1.4
How familiar are you with the artificial trans fat ban in NYC?

<u>Answer</u>	<u>Count</u>	<u>Percent</u>
very familiar	0	0%
somewhat familiar	1	13%
familiar	5	63%
not very familiar	1	13%
not familiar at all	1	13%
Total	8	100%

Table 1.5 below shows the compliance rate, disregarding their familiarity with the trans-fat ban.

Table 1.5
Irregardless of whether you are familiar or unfamiliar with the NYCban on artificial trans fats, how compliant is your establishment now?

<u>Answer</u>	<u>Count</u>	<u>Percent</u>
fully compliant	3	50%
somewhat compliant	1	17%
not very compliant	0	0%
not at all compliant	2	33%
Total	6	100%

Table 1.6 shows the changes to be made to become compliant.

Table 1.6
If not currently compliant, what will you do to become fully compliant to the artificial trans fat ban by July 2008?

<u>Answer</u>	<u>Count</u>	<u>Percentage</u>
Remove partially hydrogenated oils	3	21%
Remove margarines/ butters	2	14%
Removed the use of vegetable shortenings	2	14%
Change currently used frying oils	4	29%
Change supplier	0	0%
Change ingredients	2	14%
Other	1	7%
Total	14	100%

Table 1.7 shows the opinion of the respondents as to whether the time allotted to comply with the ban is sufficient.

Table 1.7		
Is the 18 months allotted, sufficient time to become fully compliant?		
Answer	Count	Percent
Yes	7	78%
No	1	11%
Maybe	1	11%
Total	9	100%

Table 1.8 shows if business owners have suffered a financial loss due to the ban.

Table 1.8		
Has your business suffered any financial loss since the introduction of the artificial trans fat ban?		
Answer	Count	Percent
Yes	7	78%
No	1	11%
Uncertain	1	11%
Total	9	100%

Table 1.9 shows the business owners opinion about the change in their cost base since compliance.

Table 1.9		
Please indicate how much your weekly or monthly cost basis has changed since your compliance to the ban on artificial trans fat.		
Answer	Count	Percent
Considerably	0	0%
Noticeably	0	0%
Somewhat	0	0%
Not Much	3	60%
Not Noticeable	2	40%
Total	5	100%

Table 1.10 indicates if the business owner has experienced any loss in patronage due to the ban.

Table 1.10		
Has your business lost any volume in patronage since the introduction of the trans fat ban?		
Answer	Count	Percent
Yes	0	0%
No	6	67%
Uncertain	3	33%
Total	9	100%

Table 1.11 indicates changes in the cost basis based on adjusting to the trans fat ban

Table 1.11

Please indicate how much your weekly or monthly cost basis has changed since your compliance to the ban on artificial transfat.		
Answer	Count	Percent
Considerably	0	0%
Noticeably	0	0%
Somewhat	0	0%
Not Much	3	60%
Not Noticeable	2	40%
Total	6	100%

Table 1.12 shows the opinion about costs associated with procuring alternatives.

Table 1.12		
Is the cost now, to obtain non trans fat ingredients higher or lower than prior to the ban?		
Answer	Count	Percent
Much higher	0	0%
Higher	0	0%
About the same	4	100%
Lower	0	0%
Much lower	0	0%
Total	4	100%

Patron Findings:

Table 2.1 below shows the basic percentage breakdown for the responses resulting from the patron survey. 85% of respondents that started the survey, completed it as well. About 71% of respondents that viewed the survey, completed the survey and 83.3% of respondents that viewed the survey subsequently started it as well. Perhaps the high drop-out rate is attributable to a poor survey format, or, just disinterest in taking this survey at that particular moment.

<u>Table 2.1</u>	<u>Count</u>	<u>Completed / Started</u>	<u>Completed / Viewed</u>	<u>Started / Viewed</u>
<u>Completed</u>	17	85.00%	70.83%	
<u>Started</u>	20			83.33%
<u>Viewed</u>	24			
<u>Total</u>	<u>61</u>			

Table 2.2 below shows the distribution of responses from NYC patrons per borough and as a percentage of the total responses.

<u>Table 2.2</u>		
<u>Borough</u>	<u>Count</u>	<u>Percentage</u>
Bronx	5	29%
Brooklyn	3	18%
Manhattan	7	41%
Queens	1	5%
Staten Island	1	5%
<u>Total</u>	<u>17</u>	<u>100%</u>

Table 2.3 shows what type of restaurant patrons frequent the most.

<u>Restaurant</u>	<u>Count</u>	<u>Percentage</u>
Italian	6	22.22
Far East Asian/East Asian/Indian	5	18.52
Spanish/Hispanic/TeXMexor Latin/South American	3	11.11
Caribbean or Native African	2	7.41
Russian/Savicor Australian/Exotic	2	7.41
Bakery	1	3.7
Pizza Shop	6	22.22
Fried Foods	1	3.7
Buffet Specialty	0	0
Mediterranean/Eastern/North Central or Western European	0	0
Other	1	3.7
Total	27	100

Table 2.4 below shows the majority to be unaware of artificial transitive fat amongst the respondents.

Table 2.4

<u>Answer</u>	<u>Count</u>	<u>Percent</u>
Very Familiar	0	0.00%
Somewhat Familiar	3	20.00%
Familiar	2	13.33%
Not too Familiar	3	20.00%
Unfamiliar	7	46.67%
Total	15	100.00%

Table 2.5 below shows whether respondents have consciously tried to reduce their intake of transitive fats.

Since the trans fat ban, have you consciously tried to reduce your intake of trans fat?		
<u>Answer</u>	<u>Count</u>	<u>Percent</u>
Yes	1	66.70%
No	10	66.67%
Unsure	4	26.67%
Total	15	100.00%

Table 2.6 below shows if the presence of trans fat within restaurant meals fuels adverse reaction in choice selection to eat at a restaurant amongst the respondents.

Table 2.6		
Has the transfat ban caused you to increase or decrease your overall visitation rate to restaurants?		
<u>Answer</u>	<u>Count</u>	<u>Percent</u>
Increase	0	0%
Decrease	2	13%
No Change	13	87%
Total	15	100%

Table 2.7 below shows the expected change in eating habits of the respondents once the labeling law is in full effect.

Table 2.7		
Would having this knowledge (<.5 g of trans fat must be reported on label) change your eating habits?		
<u>Answer</u>	<u>Count</u>	<u>Percent</u>
Yes	3	20%
No	7	47%
Maybe	5	33%
Total	15	100%

Table 2.8 below reveals the health history and awareness of that history of our respondents.

Table 2.8		
Are you aware or unaware of any possible illnesses or diseases, potentially related to transfat use that has endangered your health? (i.e., Heart Disease, Congestive Heart Failure, Arteriosclerosis, etc.)		
<u>Answer</u>	<u>Count</u>	<u>Percent</u>
Aware	2	13%
Unaware	8	53%
Haven't had a recent health checkup	5	33%

Chapter V

Analysis of Findings

The first question sought to find if patrons that frequent the restaurants throughout NYC were aware of transitive fat. The overwhelming evidence from the survey results is that they are not aware of transitive fat nor does knowledge of the ban change their eating habits. 67% of respondents are either not too familiar (20%) with the ban or completely unfamiliar (46.67%). About 80% are not aware of what transitive fat is or its potential harmful health effects. 53% are not aware of transitive fat while 33% had not received a recent health checkup. 67% indicated that they had not consciously tried to reduce their intake of transitive fats since the ban. The literature review suggests that patrons become concerned about transitive fat intake after a major cardiac or other health related event that alerted them to consequences associated with its intake. Mostly due to the mislabeling of food items that often had up to 35% more transitive fats than advertised. Interestingly enough, the survey says that 80% of respondents report “change or maybe” to their eating habits in response to the labeling law. The majority of the legislation that limited the use and required labeling of transitive fat took place in the early to mid 1990’s with the 2006 legislation that required labeling for the fast food industry. Although the survey did not ask for the age of the participant, my assumption is that the respondents were in the teenage to young adult age range, with a very low probability of having suffered a CHD event. The number of respondents eating at pizzerias suggests this to be true.

The second question sought to identify the compliance to the transitive fat ban and the awareness of the transitive fat ban amongst the business owners. 63% of owners reported to be familiar with the ban. 50% reported to be fully compliant at the time of this survey, disregarding their level of familiarity with the ban (mid February – mid March). About 65% of the business

owners were aware and addressed/addressing the ban on transitive fat. For a city of approximately 24,000 eateries, if one were to extrapolate, this would equate to 15,600 eateries in compliance within NYC. Certainly far from full compliance, however, 15,600 certainly does reduce the efforts on behalf of the departments and agencies that monitor and enforce this ban and ensure its success. Overall, the response to compliance is encouraging for such a large and diverse restaurant industry. The majority of the business owners in the survey have been in business for less than 10 years.

The third question asks to list the substitutes to replace the use of transitive fat and the opportunity costs associated with their uses. Opportunity costs here will mean that instead of higher amounts of transitive fats, instead, higher amounts of saturated fats, etc., are present.

Canola Oil: Saturated fat is 4% by volume. Therefore 10, 100, 1000 deciliters (10 deciliters = 1 liter) of canola oil will contain .4, 4, 40 parts per deciliter, respectively, of saturated fat and 0% artificial transitive fatty acids.

Cottonseed Oil: Saturated fat is 27% by volume. Therefore 10, 100, 1000 deciliters of cottonseed oil will contain .27, 27, 270 parts per deciliter, respectively, and 0% of artificial transitive fatty acids.

According to the results, business owners are aware of the ban on artificial transitive fats and have also been using artificial transitive fats since the last ten years. The majority had changed their fryer oils, as opposed to shortenings or margarines. This is consistent with survey respondents that are operating restaurants and not bakeries. Secondly, it reinforces that cooking oils, here in major U.S cities, are the major carrier of TFA's. Right now, the higher degree of saturated fats present in cooking oils is of concern, and needs further reinforcement into

mainstream media, necessary to reaching the general public that although transitive fats are “out” saturated fats remain an issue and cause for concern.

What I felt to be important is the problem in asymmetric information to the consumer. Lack of knowledge as to what, specifically, is in the actual food being served. This is a problem that regulation or policy will not solve completely. Our system does not operate unilaterally and will prevent full disclosure to consumers. For instance, will a diabetic really know how much sugar is in a McDonalds supersized soft drink? Not unless this individual has the ability to level the playing field, to remove the barriers and potential costs associated with asymmetric information and adverse selection, respectively. Adverse selection here means fast food outlets that are specifically placed in economically depressed locations, with targeted marketing campaigns aimed toward low income populations.

The patron survey, exhibited by percentage, indicated that restaurant visitors do not know about transitive fats, nor do they know much about their own personal health. That is really all you can take from the results of this survey. However, what is important here is that the future of health policy is to be a watch dog, a progressive tool to prevent a potential increase in economic costs (loss of work, uninsured non-payment of bills, etc.).

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Over the course of completing this research revealed a wealth of information about the expanding list of substitutes for restaurants to use in eliminating transitive fat usage. These mostly artificially created substitutes do have a few natural selections among them, including canola and soy oils. Restaurants have reported that, in general, the substitutes provide the same level of satisfaction when compared to the transitive fatty carrying counterpart. Granted that the

transitive fat is removed, a number of these substitutes do contain relatively high amounts of saturated fats. Although deemed to be not as life threatening as the ingestion of transitive fats, saturated fats, nevertheless, should not increase from the reduction in transitive fats. There is no empirical evidence to indicate what the potential costs to society will be, health wise, with this new increase in the intake of saturated fats.

I do believe that some cities should subsidize the cost for substitutes if the cheapest substitute is above a percentage level that is considered to be a barrier to entry for the substitute. It may seem highly unlikely that a restaurant will have such low profit margins due to compliance costs, such that a moderate increase in cost will not transfer to the consumer via higher prices and could jeopardize the existence of the restaurant. However, if this is demonstrated on a case by case basis, subsidies in the form of vouchers could offset the costs of substitutes. There are very many substitutes for transitive fats currently on the market, and there are more in development. The price difference for some of the substitutes, in comparison to partially hydrogenated vegetable oils, can be large and cost prohibitive, however, there are a number at the lower end, in the price range of the currently used vegetable oils laden with transitive fat. The question is, if the business owner agrees that there is not a taste difference in the product to the extent that patrons of the business will notice and discontinue either patronizing the restaurant or from purchasing their usual meals.

Miami-Dade County used grassroots initiatives from local lobbying groups and leaders that convened with policy makers in the community to create the framework for their ban on transitive fat usage. Boston's commission is convening to decide whether to institute the ban as part of a comprehensive movement to curb obesity. Transitive fats were voluntarily removed from highly popular margarine and oil brands produced in Australia, Norway, Finland and the

Netherlands, but their governments faced international pressure to do so. At least a dozen U.S. cities are in strong consideration of banning transitive fat use in bars & restaurants, and have already required the labeling of transitive fat in an area that is accessible to the consumer.

Certainly, the NYC policy that bans the use of transitive fat is legislation that can undergo juxtaposition to other major U.S. and international cities, including at the county level and over MSA's. The parameters for the NYC ban include a target size of about 24,000 restaurants, and at least 6 months to transition any restaurant or eating establishment into a transitive fat-free zone. The city also heavily invested plenty of public dollars into resources to create an information technology hub of shared information for consumers and business owners to access. The NYC DOITT hotline (311) and internet website contain comprehensive information about transitive fat risks, the scope of the ban, and available substitutes that business owners may choose from. In the literature review, we have seen other models develop, some from the grass-roots level that eventually brought about a more defined municipal legislation for the regulation of transitive fats. No municipality need take the NYC policy verbatim and implement within the boundaries of the governed domain. My recommendation is for city legislators across the U.S. to take a hard look, first, at the public hospital system, compare the number of invasive surgeries related to CHD to the cost of each surgery and the total amount of unpaid medical bills. Cities seeing increases in population, either due to "carpetbaggers" or from increases in the birthed population, will undoubtedly benefit as a function of time from such a ban.

The prevailing evidence would indicate that perhaps the more debilitating cardiovascular illnesses will take longer to develop since the plaque in the arterial wall is not accumulating due to the scarring from the ingestion of transitive fatty acids. Exercise and moderation will offset

the increases in saturated fat ingestion. What this does is put greater emphasis on the ubiquitous and spiraling obesity situation faced by most every American from school children to the elderly. Increased saturated fatty acid intake will increase total caloric intake without scarring the arterial wall.

Although this increase in consumption is still not very healthy, the impact to the circulatory and cardiovascular systems is reduced by an amount that is still unmeasured and unknown. The cost to the health care system, theoretically, will be reduced as at-risk populations will have less incidence of cardiovascular and circulatory disease and in having less ability to pay, will lessen the burden on the public system of health care in NYC. The rapid onset of cardiovascular illness should lessen as the removal of transitive fats takes effect. The expectation is for the arterial blockage rate in at-risk populations to decrease in areas subject to this ban as a function of time. Further research can be conducted in this area to determine the long term affect in removing the transitive fatty acids and increasing the saturated fatty acid usage. The research should look for increased incidences in conditions related to high levels of saturated fats in the bloodstream and to see if there is an increase in the rate of incidence as a result of the increase in the amount of saturated fats in use.

Whether the ban of artificial transitive fats within NYC restaurants is of immediate benefit is a non-issue. As stated earlier, the policy can be taken to undergo juxtaposition within similar municipalities or within MSA's. Studies have concluded that consumption of transitive fats does cause severe adverse health effects. The NYC ban is the first major step within the U.S to openly acknowledge that artificial transitive fat is the prime culprit in rising rates of CHD in the population. Since NYC restaurants are open to travelers from all over the world, the restaurant industry that operates within its domain must have heightened awareness to ensure that a

consistent level of “undesirable” content within the ingredients is maintained in the preparation of their entrees. Thus, the NYC ban has international implications for policy change in major cities in developing nations that wish to engage in preventative measures in protecting the health of their population.

The global regulatory framework is currently undergoing change. Just how much regulation is allowed in any city at any point across the world is a variable. Science has proven that transitive fatty acid consumption provides a negative impact to the economic and social fabric of a population over time. However, policy is often a laggard to scientific evidence as the wheels of bureaucracy tend to slow, and at times, prevent progressive policies from effectuating change. The benefits of removing transitive fatty acids is greater in an under developed society than would be in a developed society. These findings should offer the reader, assumed to be policy analysts, policy makers, legislators, dieticians, health policy experts, etc., an insight into the transitive fatty acid problem as well as a comprehensive overview of the history, usage, harmful effects, with empirical evidence and recommendations aimed to reduce transitive fatty acid usage and intake within a given population. At the very least, this will lower the current rate in the incidence of CHD, CHF and MI, within the restricted population.

Finally, this project furthers the understanding of not only the health problems associated with the intake of transitive fatty acids, but also the regulatory agencies that monitor the industry and the level of oversight that is bestowed there unto. The level of authority granted, as it is stated in the governing documents of the sovereign nation, grant enumerative power which dictates the amount of regulatory oversight and authority the government possesses and that can be granted to the agency. The NYC ban on artificial transitive fatty acids can undergo juxtaposition as the framework for domestic and international metropolises to follow. States and

counties within the U.S have enforced similar bans with much consumer and advocacy support. Compliance costs on the regulatory end, i.e., health inspectors and the like, can be quite high and should require a comprehensive cost/benefit analysis to determine the expense associated with ensuring the enforcement of such a ban.

CHAPTER VII: APPENDICES – APPENDIX 1A

Table 3 Fatty acid composition of the most commonly consumed partially hydrogenated oils in Iran and, for comparison, of unhydrogenated soybean and olive oils

	Percentage composition of different fats						
	Saturated	cis-monounsaturated	cis-n-6 polyunsaturated	cis-n-3 polyunsaturated	trans 18:1	trans 18:2	Total trans
Partially hydrogenated oil no. 1	23.5	30.2	10.8	0.7	31.2	3.2	34.4
Partially hydrogenated oil no. 2	22.6	33.9	6.2	0.8	31.1	5.1	36.2
Partially hydrogenated oil no. 3	24.6	31.6	19.9	0.5	21.6	1.6	23.2
Soybean oil	13.9	19.9	56.9	8.3	0.2	0.7	0.9
Sunflower oil	11.5	22.5	60.6	0.4	0.7	4.0	4.7
Olive oil	15.2	70.6	12.7	0.8	0.3	0.1	0.4

Partially hydrogenated oils, selected based on national market share (Zandi, 2004), and fatty acid compositions determined by gas chromatography using previously described methods (Baylin *et al.*, 2002). Nearly all of the partially hydrogenated oils used in Iran are imported and subsidized by the government for distribution as rationed oils. The three oils evaluated were blends of partially hydrogenated soybean (~90% content), sunflower, cottonseed and palm oils. Values may not sum to 100% due to rounding.

Baylin *et al.* (2002).
Zandi (2004).

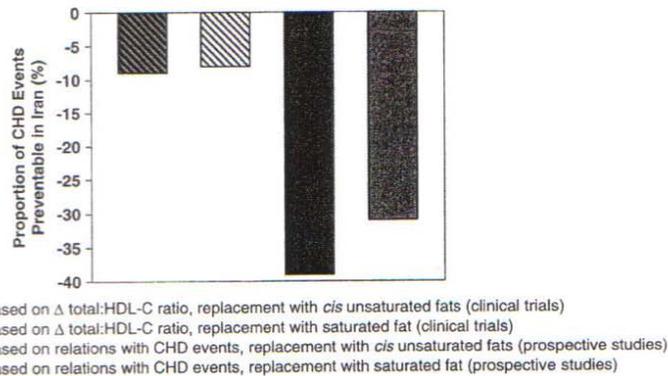


Figure 1 Estimated impact of TFA consumption on CHD events in Iran. The proportion of CHD events that would be prevented by eliminating TFA consumption from partially hydrogenated oils in Iranian homes was calculated based on (1) the effects of isocaloric replacement of TFAs with *cis*-unsaturated fats or saturated fats on the total cholesterol (TC):HDL ratio in a meta-analysis of randomized controlled dietary trials (Mozaffarian *et al.*, 2006) and the relationships of this ratio with CHD incidence (Stampfer *et al.*, 1991) and (2) the relationships of TFA intake with CHD incidence in a meta-analysis of prospective observational studies (Mozaffarian *et al.*, 2006).

impact as TFAs influence other cardiovascular risk factors beyond total and HDL cholesterol levels, including triglyceride concentrations (Mensink *et al.*, 2003), lipoprotein(a) levels (Ascherio *et al.*, 1999), low-density lipoprotein (LDL) particle size (Mauger *et al.*, 2003), systemic inflammation (Han *et al.*, 2002; Baer *et al.*, 2004; Mozaffarian *et al.*, 2004a, b; Lopez-Garcia *et al.*, 2005), endothelial function (de Roos *et al.*, 2001; Baer *et al.*, 2004; Lopez-Garcia *et al.*, 2005), and possibly abdominal adiposity and insulin resistance (Koh-Banerjee *et al.*, 2003; Kavanagh *et al.*, 2006). On the basis of relationships of TFA intake with CHD incidence seen in prospective studies, which may better account for the total effects, 39% of CHD events would be prevented by replacement of TFAs with *cis*-unsaturated fats (31% by replacement with saturated fats).

Population-attributable risks may overestimate the true effect of eliminating a risk factor owing to the principle of competing risks: when one risk factor is removed from the environment, a proportion of the events that would have been caused by that risk factor may still occur as a result of other unrelated (competing) risk factors. Additionally, most TFA intake in Iranian homes were owing to use of cooking oils, and not all the fat used for cooking might actually be consumed. To account for such potential uncertainties, we performed sensitivity analyses assuming that actual TFA consumption were only half as large as observed. In this case, the proportion of CHD events prevented by TFA elimination would be 5% on the basis of total and HDL cholesterol effects alone and replacement with *cis*-unsaturated fats (4% for replacement with saturated fats), and 22% on the basis of

APPENDIX- 2A

Survey Report : Patron Survey

Survey Statistics

Viewed	25
Started	21
Completed	17
Completion Rate	80.95%
Drop Outs (After Starting)	4

- Average time taken to complete survey : 1 minute(s)

In which borough do you live?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
 Bronx	<u>8</u>	53.33%	<input type="text"/>				
 Brooklyn	<u>2</u>	13.33%	<input type="text"/>				
 Manhattan	<u>2</u>	13.33%	<input type="text"/>				
 Queens	<u>2</u>	13.33%	<input type="text"/>				
 Staten	<u>1</u>	6.67%	<input type="text"/>				

Island

Total 15 100%

Key Analytics

Mean 2.067

Confidence [1.365 - 2.769]

Interval @ 95% n = 15

Standard Deviation 1.387

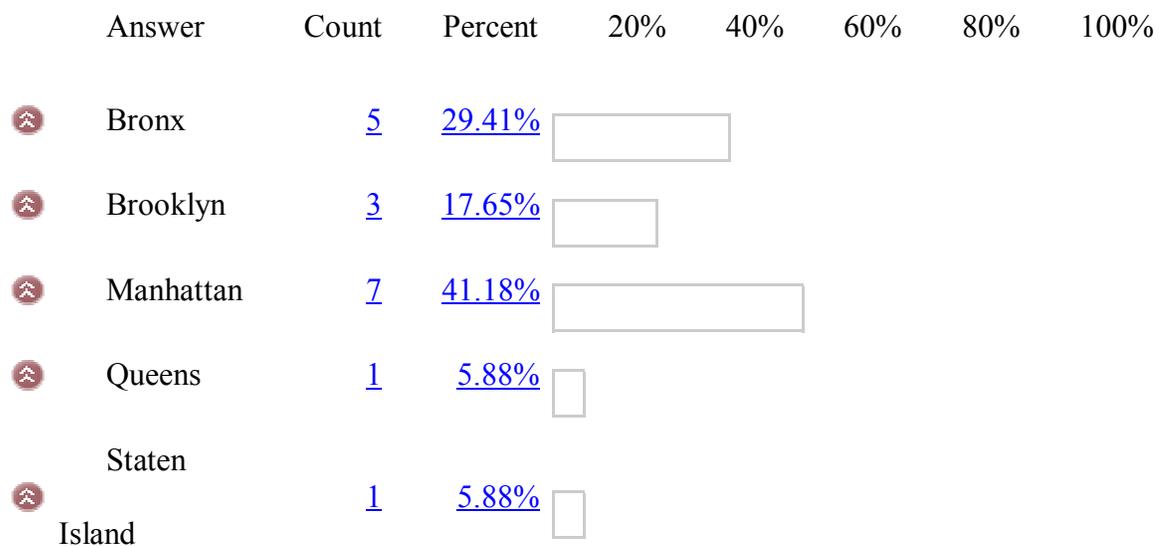
Standard Error 0.358

Key Facts

- 66.67% chose the following options :
 - Bronx
 - Brooklyn
- Least chosen option 6.67% :
 - Staten Island

In what borough(s) do you most frequent restaurants, eateries or specialty shops (Starbucks, McDonalds, etc.)

Frequency Analysis



Total	17	100%
Key Analytics		
Mean		2.412
Confidence Interval @ 95%	[1.853 - 2.971]	
Standard Deviation	1.176	
Standard Error	0.285	

Key Facts

- 70.59% chose the following options :
 - Manhattan
 - Bronx
- Least chosen option 5.88% :
 - Queens

Which type of eatery or restaurant(s) in this location do you frequent the most?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Italian cuisine restaurant	6	22.22%	<input type="checkbox"/>				
Far East Asian/East Asian//Indian cuisine restaurant	5	18.52%	<input type="checkbox"/>				
Spanish/Hispanic/TexMex or Latin/South American cuisine restaurant	3	11.11%	<input type="checkbox"/>				
Caribbean or Native African Restaurant	2	7.41%	<input type="checkbox"/>				

Russian/Slavic or			
⊕ Australian/Exotic cuisine restaurant	2	7.41%	<input type="checkbox"/>
⊕ Bakery	1	3.70%	<input type="checkbox"/>
⊕ Pizza Shop	6	22.22%	<input type="checkbox"/>
⊕ Fried Foods shop	1	3.70%	<input type="checkbox"/>
⊕ Buffet specialty shop	0	0.00%	<input type="checkbox"/>
Mediterranean/			
Eastern/Northern Central or			
⊕ Western European cuisine restaurant	0	0.00%	<input type="checkbox"/>
⊕ Other	1	3.70%	<input type="checkbox"/>
Total	27	100%	

Key Analytics

Mean 4.074

Confidence Interval @ [3.023 - 5.125]

95% n = 27

Standard Deviation 2.786

Standard Error 0.536

Key Facts

- 44.44% chose the following options :
 - Italian cuisine restaurant
 - Pizza Shop

For how long have you been eating at restaurants in NYC?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Less than 1 year	<u>4</u>	<u>26.67%</u>	<input type="text"/>				
1 to 3 years	<u>1</u>	<u>6.67%</u>	<input type="text"/>				
3 to 6 years	<u>2</u>	<u>13.33%</u>	<input type="text"/>				
6 to 10 years	<u>5</u>	<u>33.33%</u>	<input type="text"/>				
10 to 20 years	<u>2</u>	<u>13.33%</u>	<input type="text"/>				
More than 20 years	<u>1</u>	<u>6.67%</u>	<input type="text"/>				
Total	15	100%					

Key Analytics

Mean 3.200

Confidence [2.362 - 4.038]

Interval @ 95% n = 15

Key Facts

- 60% chose the following options :
 - 6 to 10 years

Standard Deviation 1.656

Standard Error 0.428

- Least chosen option 6.67% :
 - 1 to 3 years

How many times per week do you eat at any NYC restaurant?

(This includes ALL meals)

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Once or Twice	8	53.33%	<input type="text"/>				
Two to Three times	3	20.00%	<input type="text"/>				
Three or Four times	2	13.33%	<input type="text"/>				
Five to Seven times	2	13.33%	<input type="text"/>				
Eight to Ten times	0	0.00%	<input type="text"/>				
More than Ten times	0	0.00%	<input type="text"/>				
Total	15	100%					

Key Analytics

Mean	1.867
Confidence Interval @ 95%	[1.297 - 2.436]
Standard Deviation	1.125
Standard Error	0.291

Key Facts

- 73.33% chose the following options :
 - Once or Twice
 - Two to Three times

To what degree, if any, are you familiar with the NYC ban on artificial trans fat?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Very familiar	<u>0</u>	<u>0.00%</u>					
Somewhat familiar	<u>3</u>	<u>20.00%</u>					
Familiar	<u>2</u>	<u>13.33%</u>					
Not too familiar	<u>3</u>	<u>20.00%</u>					
Unfamiliar	<u>7</u>	<u>46.67%</u>					
Total	15	100%					

Key Analytics

Mean	3.933
Confidence Interval @ 95%	[3.315 - 4.552]
Standard Deviation	1.223
Standard Error	0.316

Key Facts

- 66.67% chose the following options :
 - Unfamiliar
 - Somewhat familiar

Since the trans fat ban, have you consciously tried to reduce your intake of trans fat?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
⚙ YES	<u>1</u>	<u>6.67%</u>	<input type="checkbox"/>				
⚙ NO	<u>10</u>	<u>66.67%</u>	<input type="checkbox"/>				
⚙ Unsure	<u>4</u>	<u>26.67%</u>	<input type="checkbox"/>				
Total	15	100%					

Key Analytics

Mean	2.200
Confidence Interval @ 95%	[1.916 - 2.484]
Standard Deviation	n = 15

Key Facts

- 93.33% chose the following options :
 - NO

Standard Deviation	0.561	<ul style="list-style-type: none"> Least chosen option 6.67% : <ul style="list-style-type: none"> YES
Standard Error	0.145	

Has your eatery switched to a non trans fat ingredient for your meal?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
YES	<u>1</u>	<u>6.67%</u>	<input type="checkbox"/>				
NO	<u>3</u>	<u>20.00%</u>	<input type="checkbox"/>	<input type="checkbox"/>			
Unsure	<u>11</u>	<u>73.33%</u>	<input type="checkbox"/>				
Total	15	100%					

Key Analytics

Mean 2.667

Confidence [2.354 - 2.979]

Interval @ 95% n = 15

Standard Deviation 0.617

Standard Error 0.159

Key Facts

- 93.33% chose the following options :
 - Unsure
 - NO
- Least chosen option 6.67% :
 - YES

Has the trans fat ban caused you to increase or decrease your overall visitation rate to restaurants?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Increase	<u>0</u>	<u>0.00%</u>					
Decrease	<u>2</u>	<u>13.33%</u>					
No Change	<u>13</u>	<u>86.67%</u>					
Total	15	100%					

Key Analytics

Mean	2.867
Confidence Interval @ 95%	[2.689 - 3.045]
Standard Deviation	0.352
Standard Error	0.091

Key Facts

- 100% chose the following options :
 - No Change
 - Decrease

Are you aware that trans fat in an amount less than 0.5 grams does not have to be reported on the label/menu of restaurants?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%	
YES	0	0.00%						
NO	14	100.00%						
Total	14	100%						

Key Analytics

Mean	2.000
Confidence Interval @ 95%	[2.000 - 2.000]
n	14
Standard Deviation	0.000
Standard Error	0.000

Would having this knowledge on the label/menu change your eating habits?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
YES	3	20.00%					
NO	7	46.67%					
Maybe	5	33.33%					
Total	15	100%					

Key Analytics

Mean	2.133
Confidence Interval @ 95%	[1.757 - 2.509]
Standard Deviation	n = 15 0.743
Standard Error	0.192

Key Facts

- 80% chose the following options :
 - NO
 - Maybe
- Least chosen option 20% :
 - YES

Are you aware or unaware of any possible illnesses or diseases, potentially related to trans fat use that has endangered your health? (i.e., Heart Disease, Congestive Heart Failure, Arteriosclerosis, etc.)

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
⚙ Aware	<u>2</u>	<u>13.33%</u>	<input type="text"/>				
⚙ Unaware	<u>8</u>	<u>53.33%</u>	<input type="text"/>				
⚙ Haven't had a recent health checkup	<u>5</u>	<u>33.33%</u>	<input type="text"/>				
Total	15	100%					

Key Analytics			
Mean		2.200	
Confidence Interval @ 95%	[1.858 - 2.542]		
Standard Deviation		0.676	
Standard Error		0.175	
		n = 15	
			<ul style="list-style-type: none"> • Key Facts • 86.67% chose the following options : <ul style="list-style-type: none"> ○ Unaware ○ Havent had a recent health checkup • Least chosen option 13.33% : <ul style="list-style-type: none"> ○ Aware

Survey Report : Business Owner Survey

Survey Statistics

Viewed	32
Started	23
Completed	16
Completion Rate	69.57%
Drop Outs (After Starting)	7

- Average time taken to complete survey : 3 minute(s)

In what borough(s) does your business operate in?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
⤴ Manhattan	<u>4</u>	<u>26.67%</u>	<input type="text"/>				
⤴ Bronx	<u>7</u>	<u>46.67%</u>	<input type="text"/>	<input type="text"/>			
⤴ Queens	<u>2</u>	<u>13.33%</u>	<input type="text"/>				
⤴ Brooklyn	<u>1</u>	<u>6.67%</u>	<input type="text"/>				
⤴ Staten Island	<u>1</u>	<u>6.67%</u>	<input type="text"/>				
Total	15	100%					

Key Analytics

Mean 2.200

Confidence [1.620 - 2.780]

Interval @ 95% n = 15

Standard 1.146

Deviation 0.296

Standard Error 0.296

Key Facts

- 73.33% chose the following options :
 - Bronx
 - Manhattan
- Least chosen option 6.67% :
 - Brooklyn

How long has your restaurant(s) been in business?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Less than (1) year	0	0.00%					
1 to 3 years	0	0.00%					
3 to 6 years	2	40.00%					
6 to 10 years	0	0.00%					
10 to 17 years	1	20.00%					
17 to 25 years	1	20.00%					
More than 25 years	1	20.00%					
Total	5	100%					

Key Analytics

Mean 4.800

Confidence Interval @ 95% [3.232 - 6.368]

Interval @ 95% n = 5

Key Facts

- 60% chose the following options :

Standard Deviation 1.789

Standard Error 0.800

- o 10 to 17 years

What is the estimated customer volume to your business on a weekly basis?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
10 to 50	<u>1</u>	<u>33.33%</u>	<input type="text"/>				
51 to 100	<u>1</u>	<u>33.33%</u>	<input type="text"/>				
101 to 300	<u>1</u>	<u>33.33%</u>	<input type="text"/>				
301 to 600	<u>0</u>	<u>0.00%</u>	<input type="text"/>				
601 to 999	<u>0</u>	<u>0.00%</u>	<input type="text"/>				
More than 1000	<u>0</u>	<u>0.00%</u>	<input type="text"/>				
Total	3	100%					

Key Analytics

Mean 2.000

Confidence Interval @ 95% [0.868 - 3.132]

Interval @ 95% n = 3

Key Facts

- 66.67% chose the following options :

Standard Deviation 1.000 o 51 to 100

Standard Error 0.577

What type of restaurant/eatery do you own?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Italian cuisine restaurant	<u>2</u>	<u>13.33%</u>	<input type="text"/>				
Far East Asian/East							
Asian//Indian cuisine restaurant	<u>3</u>	<u>20.00%</u>	<input type="text"/>				
Spanish/Hispanic/TexMex							
or Latin/South American cuisine restaurant	<u>0</u>	<u>0.00%</u>	<input type="text"/>				
Caribbean or Native							
African American restaurant	<u>4</u>	<u>26.67%</u>	<input type="text"/>				
Soul Food restaurant	<u>0</u>	<u>0.00%</u>	<input type="text"/>				
Russian/Slavic or							
Australian/Exotic cuisine restaurant	<u>1</u>	<u>6.67%</u>	<input type="text"/>				
Delicatessen	<u>2</u>	<u>13.33%</u>	<input type="text"/>				

Corner-type bakery	0	0.00%	<input type="text"/>
Corner-type pizzeria	2	13.33%	<input type="text"/>
Fried Foods eatery	0	0.00%	<input type="text"/>
Buffet restaurant/eatery	1	6.67%	<input type="text"/>
Mediterranean/ Eastern/Northern Central or Western European cuisine restaurant	0	0.00%	<input type="text"/>
Other	0	0.00%	<input type="text"/>
Total	15	100%	

Key Analytics

Mean	4.867
Confidence Interval @ 95%	[3.268 - 6.465] n = 15
Standard Deviation	3.159
Standard Error	0.816

Key Facts

- 46.67% chose the following options :
 - Caribbean or Native African American restaurant
 - Far East Asian/East Asian//Indian cuisine restaurant

Has your business, now or in the past, used ingredients that contain artificial trans fats?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
--------	-------	---------	-----	-----	-----	-----	------

	YES	<u>9</u>	<u>100.00%</u>	<input type="text"/>
	NO	<u>0</u>	<u>0.00%</u>	<input type="text"/>
	Total	9	100%	

Key Analytics

Mean	1.000
Confidence Interval @ 95%	[1.000 - 1.000]
n = 9	
Standard Deviation	0.000
Standard Error	0.000

How familiar are you with the artificial trans fat ban in NYC?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
very familiar	<u>0</u>	<u>0.00%</u>	<input type="text"/>				
somewhat familiar	<u>1</u>	<u>12.50%</u>	<input type="text"/>				
familiar	<u>5</u>	<u>62.50%</u>	<input type="text"/>				
not very familiar	<u>1</u>	<u>12.50%</u>	<input type="text"/>				

not familiar at all	1	12.50%	<input type="text"/>
Total	8	100%	

Key Analytics

Mean 3.250

Confidence Interval @ 95% [2.636 - 3.864]

Standard Deviation 0.886

Standard Error 0.313

Key Facts

- 75% chose the following options :
 - familiar
 - somewhat familiar

Irregardless of whether you are familiar or unfamiliar with the NYC ban on artificial trans fats, how compliant is your establishment now?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
fully compliant	3	50.00%	<input type="text"/>				
somewhat compliant	1	16.67%	<input type="text"/>				
not very compliant	0	0.00%	<input type="text"/>				

compliant			
not at all			
compliant	2	33.33%	<input type="text"/>
Total	6	100%	

Key Analytics

Mean 2.167

Confidence [0.989 - 3.344]

Interval @ 95% n = 6

Standard Deviation 1.472

Standard Error 0.601

Key Facts

- 83.33% chose the following options :
 - fully compliant
 - not at all compliant

If you are familiar with the ban, but have not fully complied with the ban, will you be fully compliant by July 1st, 2008?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
YES	4	50.00%	<input type="text"/>				
NO	0	0.00%	<input type="text"/>				
MAYBE	4	50.00%	<input type="text"/>				
Total	8	100%					

Key Analytics

Mean	2.000
Confidence Interval @ 95%	[1.259 - 2.741]
Standard Deviation	1.069
Standard Error	0.378

Key Facts

- 100% chose the following options :
 - YES
 - MAYBE

If not currently compliant, what will you do to become fully compliant to the artificial trans fat ban by July 2008?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Remove							
partially hydrogenated oils	<u>3</u>	<u>21.43%</u>	<input type="text"/>				
Remove							
margarines/butter's	<u>2</u>	<u>14.29%</u>	<input type="text"/>				
Removed the							
use of vegetable shortenings	<u>2</u>	<u>14.29%</u>	<input type="text"/>				
Change							
Remove	<u>1</u>	<u>7.69%</u>	<input type="text"/>				

currently used			
frying oils			
Change supplier	0	0.00%	<input type="checkbox"/>
Change ingredients	2	14.29%	<input type="checkbox"/>
Other	1	7.14%	<input type="checkbox"/>
Total	14	100%	

Key Analytics

Mean 3.429

Confidence Interval [2.407 - 4.450]

@ 95% n = 14

Standard Deviation 1.950

Standard Error 0.521

Key Facts

- 50% chose the following options :
 - Change currently used frying oils
 - Remove partially hydrogenated oils

If used, how long have your operations included the use of artificial trans fatty ingredients?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Less than (1) year	0	0.00%	<input type="checkbox"/>				

1 to 3 years	0	0.00%	<input type="text"/>
3 to 6 years	0	0.00%	<input type="text"/>
6 to 10 years	3	75.00%	<input type="text"/>
10 to 17 years	1	25.00%	<input type="text"/>
17 to 25 years	0	0.00%	<input type="text"/>
More than 25 years	0	0.00%	<input type="text"/>
Total	4	100%	

Key Analytics

Mean	4.250
Confidence Interval @ 95%	[3.760 - 4.740]
Standard Deviation	0.500
Standard Error	0.250

Key Facts

- 100% chose the following options :
 - 6 to 10 years
 - 10 to 17 years

Is the 18 months allotted, sufficient time to become fully compliant?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
YES	7	77.78%					
NO	1	11.11%					
MAYBE	1	11.11%					
Total	9	100%					

Key Analytics

Mean 1.333

Confidence [0.871 - 1.795]

Interval @ 95% n = 9

Standard Deviation 0.707

Standard Error 0.236

Key Facts

- Least chosen option 11.11% :
 - NO

Has your business suffered any financial loss since the introduction of the artificial trans fat ban?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
--------	-------	---------	-----	-----	-----	-----	------

⚠	YES	<u>0</u>	<u>0.00%</u>	<input type="text"/>
⚠	NO	<u>5</u>	<u>55.56%</u>	<input type="text"/>
⚠	UNCERTAIN	<u>4</u>	<u>44.44%</u>	<input type="text"/>
	Total	9	100%	

Key Analytics

Mean 2.444

Confidence Interval [2.100 - 2.789]

@ 95% n = 9

Standard Deviation 0.527

Standard Error 0.176

Key Facts

- 100% chose the following options :
 - NO
 - UNCERTAIN

Has your business lost any volume in patronage since the introduction of the ban on artificial trans fat?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
⚠ YES	<u>0</u>	<u>0.00%</u>	<input type="text"/>				
⚠ NO	<u>6</u>	<u>66.67%</u>	<input type="text"/>				
⚠ UNCERTAIN	<u>3</u>	<u>33.33%</u>	<input type="text"/>				
Total	9	100%					

Key Analytics

Mean	2.333
Confidence Interval	[2.007 - 2.660]
@ 95%	n = 9
Standard Deviation	0.500
Standard Error	0.167

Key Facts

- 100% chose the following options :
 - NO
 - UNCERTAIN

Please indicate how much your weekly or monthly cost basis has changed since your compliance to the ban on artificial trans fat.

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
⚙ Considerably	<u>0</u>	<u>0.00%</u>					
⚙ Noticeably	<u>0</u>	<u>0.00%</u>					
⚙ Somewhat	<u>0</u>	<u>0.00%</u>					
⚙ Not Much	<u>3</u>	<u>60.00%</u>	<input type="text"/>				
⚙ Not Noticeable	<u>2</u>	<u>40.00%</u>	<input type="text"/>				
Total	5	100%					

Key Analytics

Mean	4.400
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Key Facts

Confidence Interval @ 95%	[3.920 - 4.880]	o Not Noticeable
Standard Deviation	0.548	
Standard Error	0.245	

Is the cost now, to obtain non trans fat ingredients higher or lower than prior to the ban?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
Much higher	<u>0</u>	<u>0.00%</u>					
Higher	<u>0</u>	<u>0.00%</u>					
About the same	<u>4</u>	<u>100.00%</u>					
Lower	<u>0</u>	<u>0.00%</u>					
Much lower	<u>0</u>	<u>0.00%</u>					
Total	4	100%					

Key Analytics

Mean 3.000

Confidence	[3.000 - 3.000]
Interval @ 95%	n = 4
Standard Deviation	0.000
Standard Error	0.000

Were there any equipment changes/modifications/upgrades due to the ban?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
YES	<u>0</u>	<u>0.00%</u>					
NO	<u>4</u>	<u>100.00%</u>					
Total	4	100%					

Key Analytics

Mean	2.000
Confidence Interval @ 95%	[2.000 - 2.000]
Standard Deviation	0.000
Standard Error	0.000

How much of the trans fat containing ingredients did you use all together, in a week, in lbs? (ie., 10 pounds of margarine per week, etc.)

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
0 to 5 lbs	<u>2</u>	<u>50.00%</u>					
6 to 10 lbs	<u>1</u>	<u>25.00%</u>					
11 to 17 lbs	<u>1</u>	<u>25.00%</u>					
18 to 25 lbs	<u>0</u>	<u>0.00%</u>					
More than 25 lbs	<u>0</u>	<u>0.00%</u>					
Total	4	100%					

Key Analytics

Mean 1.750

Confidence [0.812 - 2.688]

Interval @ 95% n = 4

Standard Deviation 0.957

Key Facts

- 75% chose the following options :
 - 0 to 5 lbs
 - 6 to 10 lbs

Standard Error 0.479

How much trans fat (estimated) does it have now?

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
 0 to 0.25 grams	<u>0</u>	<u>0.00%</u>					
 0.26 to 0.50 grams	<u>0</u>	<u>0.00%</u>					
 more than 0.51 grams	<u>0</u>	<u>0.00%</u>					
 Do Not Know	<u>4</u>	<u>100.00%</u>	<input type="text"/>				
Total	4	100%					

Key Analytics

Mean 4.000
Confidence [4.000 - 4.000]
Interval @ 95% n = 4
Standard
Deviation 0.000

Standard Error

0.000

**Over the past ten years, what has been the growth rate in sales,
on average, for your business?**

Frequency Analysis

Answer	Count	Percent	20%	40%	60%	80%	100%
 0% to 2.5%	<u>0</u>	<u>0.00%</u>					
 2.6% to 5.0%	<u>1</u>	<u>50.00%</u>	<input type="text"/>				
 5.1% to 7.5%	<u>0</u>	<u>0.00%</u>					
 7.6% to 10%	<u>1</u>	<u>50.00%</u>	<input type="text"/>				
 11% to 20%	<u>0</u>	<u>0.00%</u>					
 21% to 50%	<u>0</u>	<u>0.00%</u>					
 More than 50%	<u>0</u>	<u>0.00%</u>					
Total	2	100%					

Key Analytics		
Mean	3.000	
Confidence Interval @ 95%	[1.040 - 4.960]	Key Facts
Standard Deviation	1.414	<ul style="list-style-type: none"> • 100% chose the following options : <ul style="list-style-type: none"> ○ 2.6% to 5.0% ○ 7.6% to 10%
Standard Error	1.000	

APPENDIX - 3A

NYC Ban On Trans Fatty Acid In Restaurants and Eateries

Hello,

You are invited to participate in our survey [**The effect of the trans fat ban**]. In this survey, approximately [100] people will be asked to complete a survey that asks questions about [**how the ban has changed your business operations, sales, and income**]. It will take approximately [7-10] minutes to complete the questionnaire.

Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any point. *Please remember, it is very important for us to learn your opinions.*

Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your information will be coded and will remain confidential. As a reward for your time in completing this survey, my research about the Artificial Trans Fat Ban in NYC will be made available to all interested participants.

Should you any have questions at any time about the survey or the procedures, you may contact [Vidia Ramdeen] by email at the email address specified below.

vramdeen@gmail.com Thank you very much for your time and support. Please start with the survey now by clicking on the **Continue** button below.

[Continue]

Business Owner – Survey:

1.) In what borough does your business operate in?

A.) Manhattan

B.) Bronx

C.) Queens

D.) Brooklyn

E.) Staten Island

2.) How long has your restaurant been in business?

A.) Less than one year

B.) 1 to 3 years

C.) 3 to 6 years

D.) 6 to 10 years

E.) 10 to 17 years

F.) 17 to 25 years

G.) More than 25 years

3.) What is the estimated customer volume to your business on a weekly basis?

A.) 10 to 50

B.) 51 to 100

C.) 101 to 300

D.) 301 to 600

E.) 601 to 999

F.) More than 1000

4.) What type of restaurant/eatery do you own?

A.) Italian cuisine restaurant

B.) Far East Asian/East Asian//Indian cuisine restaurant

C.) Spanish/Hispanic/TexMex or Latin/South American cuisine restaurant

- D.) Caribbean or Native African Restaurant
- E.) Russian/Slavic or Australian/Exotic cuisine restaurant
- F.) Bakery
- G.) Pizza Shop
- H.) Fried Foods shop
- I.) Buffet specialty shop
- J.) Mediterranean/ Eastern/Northern Central or Western European cuisine restaurant
- K.) Other

5.) Has your business, now or in the past, used trans fatty ingredients?

- A.) YES
- B.) NO

6.) How familiar are you with the trans fat ban in NYC?

- A.) very familiar
- B.) somewhat familiar
- C.) not very familiar
- D.) not familiar

7.) Disregarding of whether you are familiar or unfamiliar with the NYC ban on artificial trans fats, how compliant is your establishment now?

- A.) Fully Compliant
- B.) Somewhat Compliant

C.) Not Very Compliant

D.) Not At All Compliant

8.) If familiar with the ban, How fully compliant is your establishment now?

A.) very

B.) somewhat

C.) not very

D.) none

9.) If not compliant, what will you do to become fully compliant to the artificial trans fat ban by, July 2008?

A.) remove partially hydrogenated oils

B.) remove margarines/butter's

C.) removed the use of vegetable shortenings

D.) change currently used frying oils

E.) change supplier

F.) change ingredients

10.) Is the 18 months allotted time sufficient time to become fully compliant?

A.) Y

B.) N

C.) Maybe

11.) Since your establishment is currently in full compliance with the artificial trans fat ban, what was it that you did, specifically, to become fully compliant?

(insert answer here)

11.) And what products did you replace to become compliant? (insert answer here)

12.) What is/will be the estimated cost of/ to compliance? (insert answer here)

12.) Has your business suffered any financial loss since the introduction of the artificial trans fat ban?

A.) Yes

B.) No

C.) Uncertain

13.) Has your business lost any patronage since the introduction of the ban on artificial trans fat?

A.) Yes

B.) No

C.) Uncertain

14.) What was your best selling meal that contained the most artificial trans fat?

A.) French fries

B.) fried chicken

- C.) pizza
- D.) doughnuts
- E.) gyro's
- F.) tomato sauces
- G.) dough/fried dough
- H.) sandwiches
- I.) other baked goods
- J.) other fried foods

15.) What is NOW the best selling meal (using trans fat substitutes)?

- A.) French fries
- B.) fried chicken
- C.) pizza
- D.) doughnuts
- E.) gyro's
- F.) tomato sauces
- G.) dough/fried dough
- H.) sandwiches
- I.) other baked goods
- J.) other fried foods

16.) How much trans fat does it have now?

- A.) 0 to 0.25 grams

- B.) 0.26 to 0.50 grams
- C.) more than 0.51 grams
- D.) do not know

17.) How much of the trans fat containing ingredients did you use a week, in lbs? (ie., 10 pounds of margarine per week, etc.)

- A.) 0 to 5 lbs
- B.) 6 to 10 lbs
- C.) 11 to 17 lbs
- D.) 18 to 25 lbs

18.) How much has your cost changed due to the reduction in trans fat ingredients?

- A.) considerably
- B.) noticeably
- C.) somewhat
- D.) not much
- E.) not noticeable

19.) Is the cost now, to obtain non trans fat ingredients higher or lower than prior to the ban?

- A.) much higher
- B.) higher
- C.) about the same
- D.) lower

E.) much lower

20.) Were there any equipment changes/modifications/upgrades due to the ban?

A.) Yes

B.) No

21.) If so, what was the fixed cost of the change? (insert answer here)

22.) What is the estimated customer volume to your business on a weekly basis? A.) 10 to 50

B.) 51 to 100

C.) 101 to 300

D.) 301 to 600

E.) 601 to 999

F.) more than 1000

23.) Over the past ten years, what percent growth rate would you say your business (sales) on average, is growing at?

A.) 0% to 2.5%

B.) 2.6% to 5.0%

C.) 5.1% to 7.5%

D.) 7.6% to 10%

E.) 11% to 20%

F.) 21% to 50%)

G.) More than 50%

Patron – Survey

1.) In which borough do you live?

- A.) Bronx
- B.) Brooklyn
- C.) Manhattan
- D.) Queens
- E.) Staten Island

2.) In what borough(s) do you most frequent restaurants, eateries or specialty shops
(Starbucks, McDonalds, etc.)?

- A.) Bronx
- B.) Brooklyn
- C.) Manhattan
- D.) Queens
- E.) Staten Island

3.) Which type of eatery or restaurant(s) in this location do you frequent the most?

- A.) Italian cuisine restaurant
- B.) Far East Asian/East Asian/Indian cuisine restaurant
- C.) Spanish/Hispanic/TexMex or Latin/South American cuisine restaurant
- D.) Caribbean or Native African Restaurant
- E.) Russian/Slavic or Australian/Exotic cuisine restaurant
- F.) Bakery

- G.) Pizza Shop
- H.) Fried Foods Shop
- J.) Buffet specialty shop
- K.) Mediterranean/Eastern/Northern Central or Western European cuisine restaurant
- L.) Other

4.) (If selecting other) Please list the type of restaurant/eatery that you frequent the most.

5.) For how long have you been eating at restaurants in NYC?

- A.) Less than 1 year
- B.) 1 to 3 years
- C.) 3 to 6 years
- D.) 6 to 10 years
- E.) 10 to 20 years
- F.) More than 20 years

6.) How many times per week do you eat at any NYC restaurant? (This includes ALL meals)

- A.) Once or Twice
- B.) Two or Three times
- C.) Three or Four times
- D.) Five to Seven times
- E.) Eight to Ten times

F.) More than Ten times

7.) To what degree, if any, are you aware of the ban on artificial trans fat?

A.) Very familiar

B.) Somewhat Familiar

C.) Familiar

D.) Not too familiar

E.) Unfamiliar

8.) Since the trans fat ban, have you consciously tried to reduce your intake of trans fat?

A.) YES

B.) NO

C.) Unsure

9.) Has your eatery switched to a non trans fat ingredient for your meal?

A.) YES

B.) NO

C.) Unsure

10.) Has the trans fat ban caused you to increase or decrease your overall visitation rate to restaurants?

A.) Increase

B.) Decrease

C.) No Change

11.) Are you aware that trans fat in an amount less than 0.5 grams does not have to be reported on the label/menu of restaurants?

A.) Yes

B.) No

12.) Would having this knowledge on the label/menu change your eating habits?

A.) Yes

B.) No

C.) Maybe

13.) Are you currently aware of any possible illnesses or diseases related to trans fat use that has endangered your health? (i.e., Hypertension, arteriosclerosis, Type II Diabetes, etc.)

A.) Yes

B.) No

C.) Unsure

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