Vegetable Plate Waste

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Honor’s Project

Lindsey Maiani
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Vegetable Plate Waste Study

Lindsey Maiani

4-11-15

**Purpose**

The purpose of this research project was to perform a plate waste and nutrition study comparing Country Pure Foods’ Vegetable Fruit Blend Juices and traditional vegetables. The study was in May of 2014 at Voris and McElbright Community Learning Centers and conducted by students at the University of Akron. When we performed the project we would be looking at students choices in juice versus vegetables and selecting or not selecting. This led us to understand whether the juice or the vegetable was providing more nutrition.

**Literature Review**

Childhood obesity has been an increasing problem in America, and many studies suggest that there is a link between this growing issue and school lunches. According to the National Collaborative on Childhood obesity Research almost one third of children are obese and the numbers are on the rise (ncbor.org). Recent major changes in the National School lunch program require schools to serve healthier foods. Some of the new standards according to the National School Lunch Program website include:
### National School Lunch Program

- **Fruit**: Offer at Breakfast and Lunch
- **Vegetables**: Offer at lunch within different vegetable subgroups, Limited, two years after implementation all grains must be whole grains
- **Starches**: Limited
- **Meat/Meat Alternate**: Daily at breakfast
- **Milk**: Offer fat-free and low-fat
- **Sodium**: Reduce over ten years
- **Trans fat**: No grams allowed
- **Calories**: Meals with specific calorie range for certain age groups

Although these changes were intended to serve healthier food they are raising questions about the amount of food being wasted by students. One study suggested that nationwide students waste 1.2 billion dollars of food (ncbi.nlm.nih.gov). Even though these standards have been laid out, students still have a choice because Akron City Schools have an offer vs. serve program. This means that kids can choose what they want to take and eat during lunch, and, for example, aren’t forced to take the vegetables. So even though there is a new standard, that doesn’t mean the students are taking the healthy choices, or taking and actually eating the healthy food.

This project takes a small look at an increasingly large problem. There are many factors that play into why our society as a whole has a problem with obesity, and more specifically childhood obesity. As mentioned earlier, almost one third of children today are struggling with obesity. In 2012 8.4% of 2-5 year olds were obese, 17.7% of 6-11 year olds and 20.5% of 12-19 year olds (cdc.gov). Some of the causes of childhood obesity include: sugary drinks and junk food, advertising of unhealthy foods, variation in licensure regulations among child care centers, lack of
exercise, no safe place for children to play, limited access to healthy affordable foods, increasing portion sizes, lack of breastfeeding, and technology (cdc.gov).

### Sugary Drinks

Sugary drinks are a large part of daily calorie consumption for many people. The average can of pop has 150 calories and almost no nutritional value (hsph.harvard.edu). Although 150 calories may not seem like a lot, pop isn’t a very filling drink. So usually instead of replacing 150 calories worth of food with a can of pop, people just consume an extra 150 calories for that day. It’s not just pop though. Many beverages such as fruit punch, lemonade, and Gatorade are just as unhealthy. One can of pop added to your usual caloric intake for the day, everyday for a year would lead to an average of 5 pounds of weight gain. Enjoying a can of pop in moderation might not be detrimental to a child’s health; the fact is that drinking these sugary beverages is on the rise. There was a 60% increase in calories consumed in the form of sugary beverages by children ages 6 to 11 from 1989 to 2008 (hsph.harvard.edu). By having all of these drinks readily available to students during the school day, it could lead to higher rates of obesity. The same can be said for junk food that you would find in vending machines or served as a side during school lunch. Many of the options include candy bars and potato chips, neither of which are healthy choices.

### Advertising

Another problem is advertising unhealthy foods to kids. Although adults should take responsibility for their own choices when it comes to their diet, children can be more easily swayed. The food and beverage industry spends around 2 billion
per year and the fast food industry spends more than 5 million every day marketing unhealthy foods to kids (preventioninstitute.org). Now it makes sense why these industries spend as much as they do. They are in the business of selling food and the more food they sell, the better their business will be.

All of that money spent on ads translates to a lot of air time on the T.V. Kids watch an average of ten food ads every day and most of those ads are foods that are high in fat, sugar or sodium (preventioninstitute.org). It would be very hard for young children (and even adults) to make the right diet choices when they are being constantly bombarded with thoughts of unhealthy food. Children already get 40% of their diet from added sugars and unhealthy fats, and only 21% of children eat five or more servings of fruits and vegetables a day (preventioninstitute.org). Students need encouragement to eat healthy food because based on the facts they already know how to eat a lot of junk food.

**Child-care Centers**

Another area that needs to be examined to fully understand why childhood obesity is on the rise is the growing number of children that go to a child-care center or some program that is similar. Today there is an average of 80% of preschool-aged kids with employed mothers who use some kind of child-care center (andjrnl.org). With so many children being taken care of outside the home, it’s important to analyze how the child-care programs are being run. Habits start forming at an early age, and it would be better to start children on a positive path early in life. Regulations for these centers change from state to state, so there’s a lot of variation to how children are being taken care of. Examples of these regulations include:
water if available, sugary drinks are limited, foods of low nutritional value are limited, children are not forced to eat, food is not used as a reward, and support is provided for breastfeeding (andjrnl.org). Not all states have these regulations and even though it would seem like something the center would be striving for; it’s not always that easy. Many unhealthy foods are less expensive and sometime less of a hassle to get children to eat. This suggestion should be taken with a grain of salt because it doesn’t prove the children with stay-at-home parents are eating healthier.

Exercise

Being healthy isn’t just all about food. Another important aspect of overall health and avoiding obesity is exercise. Not everyone is going to be a marathon runner but a little effort goes a long way. 77% of kids aged 9-13 years take part in some kind of physical activity. Only 17.7% of female high school students and 36.6% of male high school students exercised 60 minutes a day in 2013 (cdc.gov). Also, a mere 24% and 34.9%, respectively, attended a gym class daily (cdc.gov). Physical activity tends to decrease as children get older. This could be because of more responsibility at work or school, or an overall lack of interest in physical activities. Either way, it’s important to start the habit at an early age and continue on with it. Physical activity doesn’t just help prevent obesity. It has also been show to help reduce depression and anxiety, improve academic grades and behavior, and help increase concentration and attentiveness (cdc.gov).

Limited safe areas

Another cause behind greater risk of obesity is lower income areas. Children in middle-class areas have a 17% greater risk to be obese than children from
wealthy areas and children from poor areas have a 28% greater risk (health.usnews.com). There is an association but no cause-and-effect has been found yet. One thought is that there are less safe places for kids to go outside and play. Another possible reason would be less involvement in sport teams that aren’t directly involved with school. This problem might not be able to be solved for every child, it is important to note it and keep in mind.

**Low-Income**

The next issue also deals with income, or lack thereof. Sometimes healthy foods are hard to come by if you are looking for an affordable option. There is usually less full-service grocery stores or farmers’ markets and the quality is sometimes poorer in low-income neighborhoods (frac.org). It can be hard enough to make the right diet decisions without the added worry that the healthy food isn’t affordable.

**Portion Size**

America has a “go big or go home” mentality. This mentality has encroached into eating habits. Part of the reason, is the amount of people who eat out on a regular basis. In 1970 34% of the food budget was used to eat out and by late 1990s 47% was used (ncvi.nlm.nih.gov). Restaurants tend to have bigger portions than you might serve yourself at home. Eventually, after eating out on a regular basis, people will become accustomed to larger portion sizes and translate that into their at-home meals. Not only will people serve larger portions to themselves, they will have a hard time feeling full if they don’t. As discussed earlier, people are exercising less and less. More food and less physical activity, over time, are going to create an issue
with obesity. For many kids, this is all they've known. They weren't alive during a
time where people exercised more and ate less fast food. So for those kids it's going
to be even harder to break habits

--- Breastfeeding

The next factor might be surprising that it affects obesity at all. Breastfeeding
a child has been proven to decrease the chances that the child will be obese (llli.org). Children age 5-6 who were never breastfed have a 4.5% rate of obesity but children
who were breastfed for more than 12 months only had a .8% rate of being
overweight (llli.org). It doesn't have to be a choice of breastfeeding for 12 months or
not at all though. A child who is breastfed for 6 months has a 22% lower rate of
obesity than a child who wasn’t breastfed. One reason behind this may be because
formula is more energy-dense than milk and leads to greater growth at an early age
and increased body fat. Another reason is that babies are more likely to finish the
bottle given to them instead of just stopping when they are full if they are breastfed
(llli.org). This idea goes along with adult’s problems with controlling their own
eating when they are served large portions. Another benefit of breastfeeding is it
tends to help mothers lose their extra weight (llli.org).

--- Technology

One of the last major contributors to obesity in children is the
overabundance of technology. This is a problem because it leads to lack of physical
activity. Not only do kids have TV and video games, now they have tablets and
smartphones to help keep them sedentary throughout the day. A study was done
and found that kids who spend 3 hours or more a day in front of technology have up
to a 44% increase to be overweight and up to 61% increase risk of being obese (livestrong.com). Although increased innovation in the technology sector is great for convenience in everyday life, it has become a hindrance in the fight against obesity.

### Legislation

Since realizing that obesity was a growing epidemic in the United States, there have been multiple different forms of legislation to try and fix the problem. The proposed bills all take a different approach and some were more effective than others.

#### Food, Conservation, and Energy Act of 2008

One of those is called the Food, Conservation, and Energy Act of 2008 or more commonly known as the Farm Bill. One part of the Farm Bill allows 15% of its funds to subsidize soybean and corn production. This actually has a large impact on programs such as the national school meals program. The farmers can sell the soybeans and corn at a lower price, which means the farmers who buy these products to feed their cattle, can sell their cattle at a lower price (ncbi.nlm.nih.gov). If healthy food can be bought at a cheaper price, schools and people will be able to afford the healthier food and hopefully choose the healthier option. This act also had a negative effect for the purpose of persuading people to eat healthier. Sugary beverages can contain high-fructose corn syrup, which is a by-product of corn. So, although healthier foods may be less expensive, unhealthy drinks and food has become cheaper as well (ncbi.nlm.nih.gov). Starting in 2008 the Farm Bill also allocated money for growing fruits, vegetables, and nuts and gave funds to states to
allow more fresh fruits and vegetables in school. This also allows schools to purchase more products from local farmers (ncbi.nlm.nih.gov).

Transportation Bill

The next bill that has tried to curb the rise of obesity is The Transportation Bill. This bill increases planning for public transportation. People will automatically get more exercise if they are walking or biking to public transportation to get to work and school (ncbi.nlm.nih.gov). It also provides support for National Safe Routes to School Program, federal initiative to promote children walking and biking to school, bike lanes, pedestrian walkways, and recreational trails (ncbi.nlm.nih.gov). Unlike the Farm Bill, so far the Transportation Bill hasn't had any negative impact on the goal of decreasing obesity.

Fairness Doctrine

Another piece of legislation is the Fairness Doctrine. The legislation deals with advertising. A number of companies had to disclose how much they were spending on focused child marketing strategies. It was found that around 870 million was spent on child marketing and 1 billion on marketing to adolescents. There was also a 300 million dollars spent as a combined effort on both age groups (ncbi.nlm.nih.gov). As a result of this, many different approaches have started being developed and implemented in many states. There's an increase in teaching children about obesity to try and prevent it, new laws that force restaurants to state how many calories are in each food choice, and many limitations have been put on the school lunch program (mentioned earlier). In addition to changing what is being consumed, many states have put more regulations on physical education in school
systems (ncbi.nlm.nih.gov). Most of these regulations require students to participate in gym class in elementary, middle, and high school. Other states have started measuring students BMI, restricting access to vending machines, and creating advisory committees (ncbi.nlm.nih.gov).

Let’s Move Program

The last major public effort to combat obesity is First Lady, Michelle Obama’s Let’s Move program. There are many different initiatives that include Let’s Move Cities, Towns and Counties, Chefs Move to Schools, Let’s Move Faith and Communities, Let’s Move Outside, Let’s Move Museums and Gardens, Let’s Move in Indian Country, Let’s Move Child Care, Let’s Move in the Clinic, and Let’s Move Salad Bars 2 Schools (letsmove.gov).

Let’s Move Cities, towns and Counties

The first initiative is Let’s Move Cities, Towns and Counties and it is split into 5 main goals. The first is called Start Early, Start Smart and it deals with elected officials helping to incorporate better nutrition and more activity starting at a young age, either in school or at home (letsmove.gov). The second goal is MyPlate, Your Place that would display MyPlate where county venues serve food. The third goal is Smart Servings for Students. This goal deals directly with schools serving healthy foods and appropriate portion sizes. Model Food Service is the fourth goal. The goal is for local officials to provide a food guideline that people can reference when making dietary decisions. The last goal is called Active Kids at Play. This goal is designed to encourage physical activities and required that there is a minimum of three programs that have proven to increase access to play areas (letsmove.gov).
Chefs Move to Schools

The next initiative is called Chefs Move to Schools. The idea behind this initiative is to pair professional chefs with different school districts to help improve the food that is served to students. Chefs are supposed to help create new creative and healthy menus for the school and teach the school’s cooks how to create the new menus. Another aspect is for the chefs to speak with the students and answer any of their dietary questions to help them better understand nutrition. The last part of this initiative is to start school gardens. Not only does it teach students valuable skills, it's also a great resource for the school lunches (letsmove.gov).

Let's Move Faith and Communities

Let's Move Faith and Communities has many goals of the previously mentioned initiative but puts the responsibility into the hands of the community and church organizations. This initiative asks people to use MyPlate to create healthy plates of food, host nutrition classes, start a community garden, feed kids over the summer, and host a weekly exercise activity (letsmove.gov).

Let's Move Outside

Let's Move Outside spotlights Junior Ranger programs. There are more than 50 national parks that already have programs and Let's Move Outside tries to bring attention and more involvement to these programs (letsmove.gov). National Parks are a great way to get in physical activity, while simultaneously enjoying the outdoors and all it has to offer.

Let's Move Museums and Gardens
The next initiative involves museums and gardens and it's called Let's Move Museums and Gardens. This initiative encourages museums to host an eat healthy, get active exhibit, teach healthy choices through afterschool and summer programs, make sure the food service has healthy choices, and create exhibits that help families learn proper nutrition (letsmove.gov).

### Let's Move in Indian Country

Next is the Let's Move in Indian Country. The goal of this initiative is to help American Indians and Alaska Native. Both of these nationalities have higher rates of childhood obesity. The first objective is to create a healthy start for children, which includes supporting women who chose to breastfeed (letsmove.gov). The rest of the objectives deal with creating a healthy environment that they can access through increased access to USDA's Food and Nutrition Services programs and bringing that healthy environment back into tribal councils (letsmove.gov).

### Let's Move Child Care

The following initiative is the Let's Move Child Care. This initiative focuses on childcare and early childhood education. Facilities must provide 1-2 hours of physical activity, reduce TV time, provide healthy food and support mothers whom breastfeed (letsmove.gov).

### Let's Move in the Clinic

The second to last initiative is the Let's Move in the Clinic. This focuses on bringing children in for wellness checkups and calculating their BMI and providing prescriptions for healthy, active living (letsmove.gov).

### Let's Move Salad Bars 2 Schools
The last initiative is the Let's Move Salad Bars 2 Schools. The objective of this is very straightforward. Provide fresh vegetables and fruit to create many options for a salad bar (letsmove.gov).

**Study**

Although there are clearly many reasons behind childhood obesity, this project takes a look at one specific cause; lack of vegetables. Thus to evaluate this we designed a study that would take a more in depth look at what students are actually consuming during lunch. Since the goal is that children receive proper nutrition, we decided to examine if giving students the option of Country Pure Foods' Vegetable Fruit Blend versus traditional vegetables would be better. If the students enjoyed the taste of the juice then they would be consuming more nutrients because they would be less likely to waste the juice and to drink other sugary drinks. We measured this by determining which option, the juice or the veggie, was taken and consumed more on average.

**Data**

The study took place in two out of the twenty-one elementary schools in Akron, Ohio.

<table>
<thead>
<tr>
<th>Study Dates</th>
<th>Food Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-May</td>
<td>Sweet Potatoes (Mashed)</td>
</tr>
<tr>
<td>2-May</td>
<td>Wango Mango Juice (Vegetable Juice Blend)</td>
</tr>
<tr>
<td></td>
<td>Wango Mango Juice (Vegetable Juice Blend) and/or Carrot</td>
</tr>
<tr>
<td>6-May</td>
<td>Sticks</td>
</tr>
<tr>
<td>7-May</td>
<td>Broccoli (No Sauce)</td>
</tr>
</tbody>
</table>

We went to each school twice and followed the same procedure all four times. We took the initial weight of each vegetable choice for our records. Then after
every student was done eating we would collect their trays and weigh the remaining food that they didn’t eat. Day One we collected waste of Sweet Potatoes, Day Two was Wango Mango Juice, Day Three was Wango Mango Juice and/or Carrots, and Day Four was Broccoli. Country Pure Foods created the veggie juice in this project. After weighing all of the vegetables we determined how much on average was wasted. Then the next step would be to examine how this affects nutrition.

The results of this experiment definitely pointed to the students’ preferences for the Wango Mango Juice over the veggies. In this first chart you can see that the lowest waste was during the day that only juice was served. The highest waste being when sweet potatoes were served. Broccoli fell in the middle and the juice during carrot day and carrots fell slightly under that. This part of the data just shows that the students are clearly willing to waste less if they enjoy the taste of the food. The second chart shows the same, but in percent form.
The next three graphs are also very important to understanding the scope of the experiment. Although it's important to note which food produced the least waste in schools, it is also important to note how many students actually took each of the veggies. The biggest percent of students took the Wango Mango juice yet wasted the least, and the least amount of students took sweet potatoes yet wasted the most.
The last four graphs represent the kind of nutrients the students would be getting from a serving of any of the veggies/juice. The best source of Vitamin A comes from carrots. The best source of Vitamin C and E and Potassium comes from the Wango Mango Juice.
Vitamin A

Vitamin C

IU/Grams

Broc | Carrots | Sweet Potatos | Juice
---|---|---|---
0.005 | 6000 | 1000 | 0
0.01 | 5000 | 1000 | 0
0.015 | 4000 | 1000 | 0
0.02 | 3000 | 1000 | 0
0.025 | 2000 | 1000 | 0

Vitamin C

0 | 0.005 | 0.01 | 0.015 | 0.02 | 0.025
Broc | Carrots | Sweet Potatos | Juice
---|---|---|---
0.005 | 0.02 | 0.015 | 0.02
0.01 | 0.02 | 0.015 | 0.02
0.015 | 0.02 | 0.015 | 0.02
0.02 | 0.02 | 0.015 | 0.02
0.025 | 0.02 | 0.015 | 0.02
**Implications**

This study shows that if lawmakers and school officials are concerned with students’ nutrition, they should consider allowing the Vegetable Juice to be offered on a daily basis. If the juice is available to the students more often then the students will likely be consuming more nutrients that they need.
**Limitations**

This experiment shows a lot of interesting facts, but there are limitations to this project. There was a limit of time, so not every single tray could be measured. Although there wasn't a reason behind which trays were measured, there could have been some differences in the end results if every tray had been measured. Originally we were just going to observe the waste behind every product but that didn't seem to show an overall picture. This is when it was decided we would look into how nutritional each food item was compared to how much the kids were actually consuming.

It also would've been better if the study could've been enlarged. The project only looked at two schools in the Akron area. Taste and preference could be different throughout the state or even the country. Also, each school had data collected from it twice. This could've changed the results because on those particular days the students might not have felt that hungry or had some other event disrupt their normal eating habits. For example, one day the students had testing and ate in their classrooms instead of eating in the cafeteria. Some students might find the prospect of testing to be very nerve racking and might have eaten less or more than normal because of the special situation. Even though there were certain parts of the project that could be improved upon, overall the study is fairly representative of what school age students are willing to eat and how they would prefer to consume their nutrition.
Conclusion

Based on this study and the information that I have read, there does seem to be a disconnect between information and action. There is a lot of information available to the public regarding nutrition and what causes obesity. The next step is to translate the information into action. Whether you are a proponent for programs or personal responsibility the United States needs to start making a change to reduce childhood obesity. My recommendation is to continue promoting healthier eating in schools by providing options that children will enjoy eating like veggie juices. This will provide more nutrition the students need and be a small step toward reducing childhood obesity.
Works Cited


