



# Antioxidant powerhouses and more...

## *100% Grape Juice from Concord and Niagara Grapes*

The importance of dietary antioxidants in the prevention of chronic disease is an expanding area of focus for nutrition science and research today. Epidemiologic data clearly indicate that diets high in fruits and vegetables play a role in reducing the risk of chronic diseases like heart disease<sup>1-3</sup> and cancer,<sup>2,4</sup> and possibly progressive age-related conditions like Alzheimer's Disease.<sup>5</sup>

As our recognition of the need for dietary antioxidants increases, we are also finding that our understanding of what constitutes antioxidants is changing. The narrow definition of antioxidants as comprising mainly vitamins A, C and E now appears simplistic, replaced by a growing belief that the benefits derived from a diverse, plant-based diet likely come from a synergy between a wide range of bioactive compounds found in fruits and vegetables. With this new understanding comes a new term — "phytochemicals" or, better still, "phytonutrients".

The term "phytonutrients" is derived from the Greek word *phyto*, meaning plant. These "plant nutrients" can be defined as bioactive plant compounds found in fruits, vegetables, grains and other plant foods that have been linked to reducing the risk of major chronic diseases<sup>6</sup> — in part due to their potent antioxidant properties. While technically not yet recognized as nutrients, they are being actively studied for their potential contribution to health beyond basic nutrition.<sup>7</sup> Bioactive phytonutrients, found in significant amounts in plant-based foods, may be the key behind such now-familiar concepts as "the French Paradox" and "the Mediterranean Diet".

In keeping with this broader mindset, nutrition science is now looking at measurements like oxygen radical absorbance capacity (ORAC) and total antioxidant capacity (TAC) as guides to the antioxidant benefits a given food may or may not provide. Using these methodologies, the USDA has begun assembling a database of the antioxidant capacity of common foods.<sup>8</sup> This is a massive undertaking, and it is understandably incomplete. The antioxidant capacity of some common foods and beverages is listed inside.

One widely studied group of phytonutrients is the polyphenolics. (A classification of dietary polyphenolics is provided inside.) Polyphenolics act as defense mechanisms against pathogens, parasites and predators in the plants. In some cases, they contribute to the color of the plants themselves. Flavonoids are a subgroup of polyphenolic compounds that are recognized for their antioxidant capacity. These include the anthocyanins, the compounds responsible for giving blue and purple fruits their dark coloring, and the proanthocyanidins, a particularly promising set of compounds for which the USDA has developed its own dedicated database.<sup>9</sup>

Antioxidants serve several functions in the body that can contribute to healthy physiological function. One of the outcomes of oxidation is the production of compounds in the body called "free radicals". These free radicals can attack otherwise healthy cells and cause damage to cells, which many medical researchers believe presents an increased risk for cancer.<sup>10</sup> Free radicals can also disable helpful compounds like nitric oxide, which is closely linked to several mechanisms of healthy cardiovascular function.<sup>11</sup> Increasing the body's natural antioxidant capabilities quenches existing free radicals and reduces the production of new ones. Consumption of fruits, vegetables and whole grains has long been linked to reduced risk of chronic disease.<sup>2</sup> The antioxidative compounds in these foods are thought to be responsible for at least a portion of that reduced risk.

Beyond their direct antioxidant effect, phytonutrients may offer positive contributions in other ways as well. Concord grape juice is a good example. It has an extremely high antioxidant capacity, and subjects drinking this juice in clinical studies have shown a number of positive, antioxidant-related outcomes such as increased plasma antioxidant capacity, decreased superoxide production, and slowed LDL oxidation.<sup>12</sup> At the same time, subjects have also shown enhanced arterial function, improved endothelial function and decreased platelet aggregation<sup>13</sup> — positive cardiovascular outcomes that are due to more than just the phytonutrients' antioxidant function. Likewise, in laboratory animal studies, both blueberries and Concord grape juice have shown some ability to enhance motor skills and cognitive function in ways that appear to be unrelated to antioxidant function.<sup>14</sup> Fruits high in polyphenolics have shown antiproliferative activities in laboratory studies.<sup>15</sup> This may or may not be specifically related to antioxidant function.

As is often the case, the emerging study of phytonutrients raises more questions than science can definitively answer. What the data suggest, however, is that the benefits of a high

fruit and vegetable diet are likely due to the complex synergy among the hundreds of phytonutrients found in these foods, and not the result of a handful of easily identified antioxidants. Because some foods contain certain groups of phytonutrients and other foods contain other types, it makes sense to eat a wide variety of colorful foods.

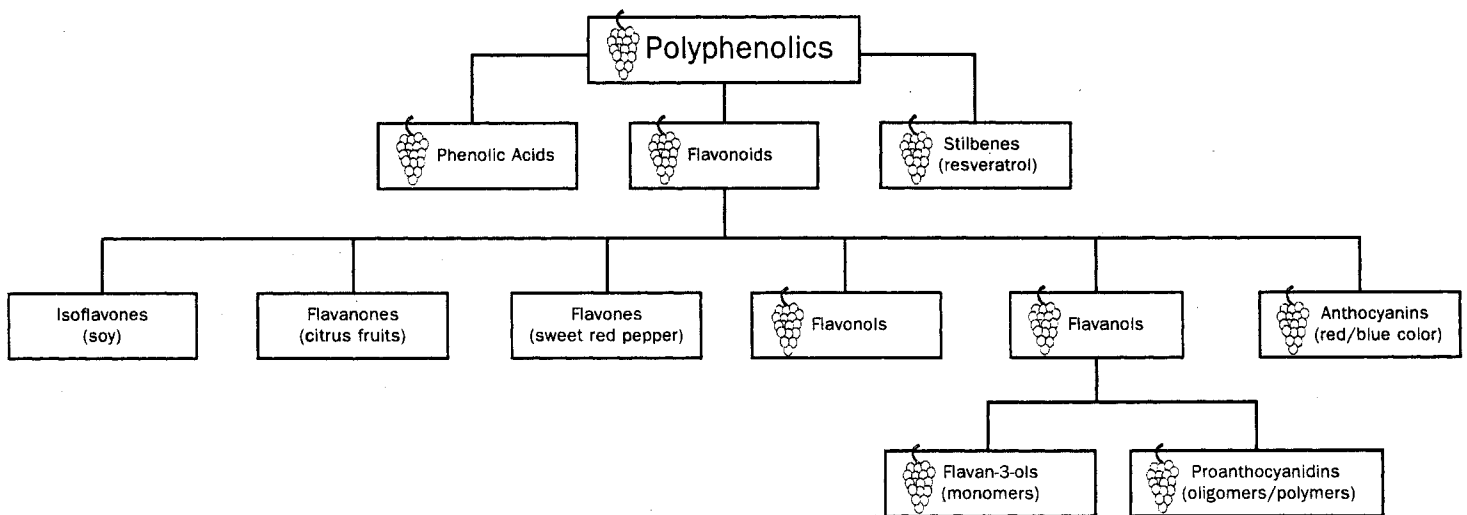
### The Chemistry of Polyphenolics

Polyphenolic terms and classifications are often confused. A common error is that resveratrol, a compound to which many of the positive effects of red wine and Concord grape juice are incorrectly attributed, is often thought to be a flavonoid. While it is in the overall polyphenolic group, it is a stilbene — not a flavonoid.

At the same time, in this relatively new area of biochemistry, there are some legitimate differences of opinion as well. (Some chemists, for example, list proanthocyanidins as part of a larger class of polyphenolic tannins rather than a subgroup of flavonoids.) The chart below presents a consensus of the polyphenolic category.

Another misconception is that there is a direct link between the dark coloring found in Concord grape juice and its high antioxidant properties. Interestingly, while the anthocyanins — the polyphenols responsible for the dark purple coloring — contribute some antioxidant power, proanthocyanidins, which are colorless, actually provide most of the antioxidant power. White grape juice made with Niagara grapes, which contains no anthocyanins, has substantial antioxidant capacity from the abundance of proanthocyanidins, found primarily in the skin and seeds of the grapes. Other white grape juices, often made solely from Thompson seedless grapes or with very little Niagara grape content, lack these proanthocyanidins and have very little antioxidant capacity.

The boxes marked with a grape cluster (below) denote polyphenolics that are found in red wine and Concord grape juice.



## Antioxidant Powerhouses — Common Foods and Juices

To establish an antioxidant capacity database, the USDA has undertaken the massive task of testing foods consumed by the U.S. population. This will take many years to complete. The table below is adapted from the USDA study published in late 2004,<sup>a</sup> which will serve as the foundation of the new antioxidant capacity database. The study used a method of measurement called Total Antioxidant Capacity, or TAC, to assign a numerical value for a food's antioxidant power. For purposes of comparison, we have inserted the antioxidant capacity values for various commonly consumed juices. The USDA study considered only a small sampling of juices, thus omitting those most commonly consumed. The antioxidant capacity values for the juices were computed from data prepared by an independent laboratory using the same ORAC methodology used by the USDA laboratory and are for comparison purposes only.

### Total Antioxidant Capacity of Common Foods and Juices

Foods with TAC/serving of 2000 and higher "could be regarded as the best sources of total antioxidant capacity"<sup>a</sup>

Ranking	Foods Tested <sup>a</sup>	Antioxidant Capacity per serving <sup>a</sup>	Number of samples
1	Small Red Beans, dry (1/2 cup)	13,727	1
2	Wild Blueberries (1 cup)	13,427	1
3	(Red) Kidney Beans, dry (1/2 cup)	13,259	1
4	Pinto Beans, dry (1/2 cup)	11,864	3
5	Cultivated Blueberries (1 cup)	9,019	8
6	Cranberries (1 cup)	8,983	3
7	Artichokes, cooked (1 cup hearts)	7,904	2
8	Blackberries (1 cup)	7,701	4
9	Dried Plums (Prunes) (1/2 cup)	7,291	8
	<b>Welch's 100% Grape Juice from Concord grapes (8 oz.)</b>	<b>6,582</b> <sup>b</sup>	<b>10</b>
10	Raspberries (1 cup)	6,058	6
11	Strawberries (1 cup)	5,938	8
	<b>100% Pomegranate Juice (8 oz.)</b>	<b>5,634</b> <sup>b</sup>	<b>3</b>
12	Red Delicious/Granny Smith Apple (1 fruit)	5,600	8
13	Pecans (1 oz.)	5,095	8
14	Sweet Cherries (1 cup)	4,873	4
15	Black Plums (1 fruit)	4,844	2
16	Russet Potato, baked (1 potato)	4,649	4
17	Black Beans, dry (1/2 cup)	4,181	1
18	Plums (1 fruit)	4,118	8
19	Gala Apple (1 fruit)	3,903	3
20	Walnuts (1 oz.)	3,846	8
	100% Grapefruit Juice (8 oz.)	3,049	1
	<b>Welch's 100% White Grape Juice from Niagara grapes (8 oz.)</b>	<b>2,849</b> <sup>b</sup>	<b>31</b>
		----- 2,000 -----	
	<b>100% Orange Juice (8 oz.)</b>	<b>1,619</b> <sup>b</sup>	<b>19</b>
	100% Tomato Juice (8 oz.)	1,527	1
	V8 Vegetable Juice (8 oz.)	1,329 <sup>b</sup>	1
	<b>100% Apple Juice (8 oz.)</b>	<b>1,009</b>	<b>32</b>
	100% Juice – Other white grape (8 oz.)	895	20
	100% Juice – White Cranberry Blend (8 oz.)	583	4

<sup>a</sup>Wu X, Beecher GR, Holden JM, Haytowitz DB, Gebhardt SE and Prior RL. Lipophilic and hydrophilic antioxidant capacities of common foods in the United States. *J Agric Food Chem.* 2004. 52(12):4026-4037. (USDA study) Antioxidant Capacity reported is Total Antioxidant Capacity (TAC) = Lipophilic Oxygen Radical Absorbance Capacity (L-ORAC<sub>n</sub>) + Hydrophilic Oxygen Radical Absorbance Capacity (H-ORAC<sub>n</sub>). Values reported as average μmol TE/serving.

<sup>b</sup>Independent laboratory testing by Brunswick Laboratories; commissioned by Welch's – data as of 3/08/05. Antioxidant Capacity reported is Hydrophilic Oxygen Radical Absorbance Capacity (H-ORAC<sub>n</sub>). Values reported as average μmol TE/serving.

## Antioxidant Methodology

Relative antioxidant values used here have been determined using the oxygen radical absorbance capacity assay (ORAC) using fluorescein as the fluorescent probe in the assay.<sup>16</sup> This is an *in vitro* analysis that measures the ability of a substance to subdue oxygen free radicals and is not a direct measurement of what happens in the human body. While other *in vitro* antioxidant capacity assays exist (TEAC, TRAP, FRAP, DPPH) USDA scientists appear to have settled on ORAC as their accepted standard.<sup>17,18</sup> A recent enhancement of the ORAC assay methodology has allowed for the separate measurements of lipophilic and hydrophilic components of the same sample, providing a more complete antioxidant profile. As published in the USDA study, the combination of the lipophilic and hydrophilic values provides the total antioxidant capacity (TAC) value referenced in the previous table.<sup>8</sup>

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# Concord Grape Juice

## *Helping to Promote a Healthy Heart*

The juice, jam and jelly made from Concord grapes are deliciously familiar products to almost all of us. What you may *not* know, however, is that medical researchers have been studying Concord grape juice for almost a decade now, and the published clinical research suggests that drinking juice made from Concord grapes helps promote a healthy heart and arteries.

Here are some important facts:

**Juice from Concord grapes is packed with potent natural antioxidant compounds – ranks the #1 beverage as reported in the new USDA Proanthocyanidin Database**

- Consumption of foods rich in polyphenols (natural bioactive plant compounds often called phytonutrients) has long been linked to cardiovascular benefits, and higher consumption of fruits and vegetables has been linked to reduced incidence of cardiovascular disease and its associated risk factors.<sup>1,2</sup> Grape juice made from Concord grapes, much like red wine, and other darkly colored fruits and vegetables, is especially rich in polyphenols.
- Many researchers attribute one source of these cardiovascular benefits to the potent antioxidant effects provided by a specific class of polyphenols called flavonoids. Cardiovascular disease, as well as cancer and diseases associated with aging, are thought to be caused, in part, by oxidant stress. The presence of antioxidants helps to counteract this stress by neutralizing free radicals that could otherwise damage cell molecules.
- One of the most common sources of dietary antioxidants are flavonoid compounds called proanthocyanidins. Of all the beverages reported in the new USDA Proanthocyanidin Database,<sup>3</sup> grape juice made from Concord grapes had the highest level of proanthocyanidins per serving, exceeding red wine, brewed tea, cranberry juice cocktail and apple juice.
- This isn't surprising. Several years ago, USDA researchers published a study that measured the antioxidant capacity of several popular fruit juices purchased from retail locations.<sup>4</sup> They found grape juice made from Concord grapes to have more than two times the antioxidant capacity of orange, apple, grapefruit or tomato juice.

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*Consumption of grape juice made from Concord grapes can help promote a healthy heart and may help prevent heart disease and other chronic diseases by improving the body's ability to deal with oxidative stress.*  
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**Clinical findings suggest potent *in vivo* antioxidant activity. Concord grape juice has been shown to slow oxidation of LDL cholesterol — a contributor to atherosclerosis**

- While the flavonoid components of Concord grape juice are potent antioxidants *in vitro*,<sup>5</sup> researchers found in a number of preliminary clinical studies that drinking Concord grape juice increased plasma antioxidant capacity and slowed the oxidation of LDL cholesterol—the so-called “bad cholesterol”.<sup>6,7,8</sup> Slowing the oxidation of LDL is thought by many researchers to be an important way to inhibit the atherosclerotic process. During normal circumstances, LDL molecules will pass through the endothelium, lodge for a period of time within the inner wall of the artery, then re-enter the bloodstream. While the LDL is inside the arterial wall, it is particularly prone to oxidation. If the LDL oxidizes within the arterial wall, it may initiate a chain of events that can lead to atherosclerosis.<sup>9</sup> Thus, when LDL is slower to oxidize there is less likelihood that the oxidation will occur in the arterial wall.

*Slowing the oxidation of LDL cholesterol by Concord grape flavonoids supports the body's natural system for promoting healthy clear arteries, so blood can flow freely to where it is needed.*

**Concord grape juice may provide an anti-clotting effect**

- Beyond its potent antioxidant effect, one of the additional ways Concord grape juice appears to act to promote a healthy heart is similar to that of aspirin. Through an antithrombotic or anticlotting effect, clinical research suggests that Concord grape juice inhibits the tendency of blood platelets to aggregate and potentially form harmful blood clots.
- Folts and colleagues, publishing in *Circulation* one of the first pre-clinical studies on Concord grape juice, showed that drinking Concord grape juice had an effect on platelet activity similar to aspirin's.<sup>10</sup> Confirmatory clinical studies have since been performed on the platelet-inhibitory properties of Concord grape juice, with most observing platelet inhibition.
- Subsequent clinical studies by the same group also showed that while Concord grape juice is a potent platelet inhibitor, orange and grapefruit juice do not inhibit platelet aggregation. This is attributed to differences in flavonoid content between the juices.<sup>11,12</sup>

*Consumption of juice made from Concord grapes may help promote a healthy heart by reducing the tendency of blood platelets to stick together and form harmful clots.*

**Promoting Healthy Arteries: Enhancing arterial flexibility and endothelial function**

- Concord grape juice flavonoids have also been shown to have a vaso-relaxant effect. In a study of 15 patients with coronary artery disease, published in *Circulation*, Stein and colleagues used ultrasound technology to measure the brachial artery's ability to respond to sudden increases in blood flow.<sup>6</sup> This group found that the subjects had significantly more flexible arteries after drinking Concord grape juice than before. Healthy, flexible arteries enable the arteries to expand, allowing greater blood flow where and when it is needed.
- This group did a second study on endothelial function with 22 patients and found that daily consumption of Concord grape juice improved the flow-mediated vasodilation of the brachial artery in participants with cardiovascular disease.<sup>13</sup>

*A healthy endothelium is one of the first lines of defense against vascular disease like atherosclerosis. There is a growing body of research that shows that compounds in Concord grape juice contribute to a healthy, flexible endothelium.*

**Concord grape juice may help promote healthy blood pressure – preliminary studies point to possible blood pressure reduction**

- It has been found in two preliminary studies that drinking Concord grape juice lowered blood pressure in the hypertensive study participants.<sup>14,15</sup> Both studies were conducted on a small scale, so it is premature to draw strong conclusions about the benefits of Concord grape juice in this area until completion of a larger study using more robust blood pressure monitoring.

*Because of its positive effect on endothelial function and arterial health, a number of researchers in this field believe that drinking Concord grape juice may also contribute to healthy blood pressure. Additional studies are under way.*

**Concord grape juice promotes production of nitric oxide – thought to be a possible mechanism of action for healthy endothelial function**

- Nitric oxide is a potent vasodilator and a vital contributor to healthy arteries in many ways. One of the most important is the enhancement of endothelial function, which leads to more flexible arteries, and may contribute to lower blood pressure.

- Freedman and colleagues showed that production of platelet-derived nitric oxide was increased *ex vivo* by consumption of Concord grape juice.<sup>16</sup> The same study showed that the production of superoxide, a free radical that stimulates potentially harmful oxidation in the body, was reduced *ex vivo* by consumption of Concord grape juice.

*A potential mechanism for the beneficial effects of Concord grape juice may be the increase in nitric oxide production coupled with the decrease of superoxide production.*

#### **Some common questions:**

**How much do you have to drink? What about sugar? Does grape juice have the same benefits as red wine?**

- Drinking a glass of juice made from Concord grapes every day as part of a balanced diet is a heart-healthy and delicious choice for both adults and children. A 6 oz. glass counts as a serving of fruit toward your recommended 5-9 servings of fruits and vegetables a day,<sup>17</sup> and contains no fat or cholesterol. The Produce for Better Health Foundation reports that the blue/purple category of fruits and vegetables is significantly underrepresented in the American diet.<sup>18</sup> Drinking grape juice is a great way to remedy this problem.
- Concord grape juice clinical research has been conducted with consumption ranging from 4 mL/kg<sup>13</sup> of body weight per day of 100% Concord grape juice to as high as 10 mL/kg.<sup>7</sup> Folts and colleagues found that a group of subjects drinking 4 mL/kg of 100% Concord grape juice achieved similar flow-mediated vasodilation (a measure of endothelium flexibility) to that of a group drinking 8 mL/kg.<sup>13</sup> For the average woman (152 lbs.) or man (180 lbs.), 4 mL/kg equates to drinking about 9-11 ounces of Concord grape juice.
- 100% grape juice made from Concord grapes has no added sugar, is a rich source of natural antioxidant compounds, and may be cardio-protective in a variety of ways. Limiting intake of foods and beverages with added sugars and low nutrient and micronutrient density may easily allow the daily consumption of Concord grape juice as part of a healthy diet.
- A recent study in *JAMA* noted that, unlike sugar-sweetened beverages, fruit juice consumption was not associated with diabetes in young and middle-aged women.<sup>19</sup>

*Drinking juice made from Concord grapes is a heart-healthy choice that provides a welcome alternative to daily red wine consumption for many. It provides many of the same flavonoid-derived benefits without the concerns of alcohol. Both beverages are rich in polyphenols; both are made from antioxidant-rich, deeply colored grapes.*

#### **Benefits may extend beyond heart disease**

- The flavonoids found in Concord grapes may have health benefits that extend well past heart disease because of their potent antioxidant capability and possible effect on human health in a variety of ways. Researchers have seen preliminary, yet positive, effects in pre-clinical studies in the areas of cancer,<sup>20</sup> cognitive function and aging.<sup>21</sup> While these areas of research have barely been tapped, they hold promise. More researchers are now studying these possible benefits.

#### **Research Highlights**

*There are a number of potential benefits to drinking Concord grape juice:*

- High in antioxidants
- High in flavonoid phytonutrients
- Platelet inhibition
- Healthy endothelial function
- Slowed oxidation of cholesterol
- Healthy blood pressure
- Possible benefits in chronic diseases such as cancer and aging.



#### **Easy Lifestyle Fit**

Grape juice made from Concord grapes is a great choice for those with heart-health on their mind. Health care professionals often despair at their inability to change their patients' unhealthy lifestyles. Invariably, big lifestyle changes are hard to make, and even harder to keep. For consumers looking for easy ways to live a heart-healthy lifestyle, drinking juice made from Concord grapes is one of those incremental changes that just may stick, and yield benefits for years to come. It's never too early to start being good to your heart.

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# White Grape Juice

*The clear choice for infants & toddlers*

White Grape Juice made with Niagara Grapes –  
clear benefits for the whole family.

White grape juice has been shown to be the best choice for “baby’s first juice” because it contains an even balance of carbohydrates and it does not contain sorbitol, thus making it the most well digested and absorbed clear juice for infants and toddlers. But a closer look among white grape juices and other clear juices shows that white grape juice made with Niagara grapes actually offers an abundance of natural antioxidants and potent antioxidant capacity to potentially benefit the whole family.

Here are some important facts:

**Make first juice choices  
based on science, not anecdote**

- The American Academy of Pediatrics recommends waiting until infants are six months old before introducing pasteurized 100% juices.
- For many years, apple juice was the most common choice for an introductory juice. But this was a choice based on tradition and availability rather than on scientific information. About 20 years ago, pediatric researchers began investigating the relative benefits of common clear juices.
- The theory that the carbohydrate composition and constituents of apple juice might make it difficult for infants to digest was proposed in the mid-1980’s. Hyams published a study titled “Apple juice: an unappreciated cause of chronic diarrhea”.<sup>1</sup> A subsequent study by the same group titled “Carbohydrate malabsorption following fruit juice ingestion in young children” was later published.<sup>2</sup> Soon afterward Lifshitz and colleagues published a landmark paper

titled “Role of carbohydrate malabsorption in chronic nonspecific diarrhea in children”.<sup>3</sup>

- By the mid-1990’s, medical literature strongly suggested that the carbohydrate composition, namely the imbalance of fructose and glucose plus the presence of sorbitol, made apple juice more difficult for some infants and toddlers to digest. In contrast, white grape juice, with its equal balance of fructose and glucose and no sorbitol, emerged as the best choice for an introductory juice since it was better absorbed by infants and toddlers up to five years of age.<sup>4,5</sup>

*White grape juice, unlike apple and pear juice, has an equal balance of fructose and glucose, and contains no sorbitol. This makes it the easiest of the popular clear juices for infants and toddlers to digest, and a great choice as an introductory juice.*

### **Causes and consequences of carbohydrate malabsorption**

- When glucose and fructose in juices are present in roughly equal proportions, they are easily absorbed by infants, thereby providing beneficial complementary nutrition. However, when quantities of fructose exceed glucose, the excess fructose can be poorly absorbed and eventually passes into the colon where it can create excess gas and other problems.<sup>6,7</sup> Sorbitol is also difficult to absorb and compounds the absorption problems of excess fructose.<sup>8</sup>
- Both apple and pear juice have a fructose/glucose ratio of greater than 2:1. They also both contain sorbitol. In contrast, white grape juice contains a 1:1 glucose/fructose ratio and contains no sorbitol.
- Carbohydrate malabsorption is most often measured using breath hydrogen (BH<sub>2</sub>) excretion. A level of more than 20 ppm of hydrogen in the breath sample is considered the threshold that indicates carbohydrate malabsorption. The greater the quantity of hydrogen, the more extreme the malabsorption and the greater the likelihood of problematic symptoms.
- In 1999, Cole and colleagues found that pear juice but not white grape juice caused increased fussiness—measured as a function of physical activity in a motion-sensitive infant metabolic chamber—in babies after feeding.<sup>9</sup> They fed each child a serving of juice, then monitored breath hydrogen and physical activity for a period of four hours. They found a strong correlation between increased BH<sub>2</sub> levels and increased physical activity.

*When babies are unable to absorb carbohydrates, a number of symptoms may present, including gas, bloating, difficulty sleeping after feeding, painful discomfort, crying and diarrhea.*

### **Improved digestion with white grape juice**

- Lifshitz and colleagues published a study titled “Carbohydrate absorption from fruit juice in young children” that looked, for the first time, at the relative ability of infants to digest white grape juice and apple juice.<sup>10</sup> Using breath hydrogen analysis, they showed that white grape juice was more easily digested than apple juice in very young children.
- Lifshitz subsequently published “Carbohydrate absorption from one serving of fruit juice in young children: Age and carbohydrate composition effects”.<sup>11</sup> This important study looked at 104 children, ages 1-5 years, who drank one serving of apple, pear, white grape juice or purple grape juice. The study confirmed that infants and toddlers had more difficulty digesting juices with high fructose/glucose ratios and containing sorbitol (apple and pear). They also found that the differences were more significant in the younger children.

*Results of improved digestibility with white grape juice vs. other clear juices like apple and pear have been attributed to the differences in carbohydrate profiles of the juices, citing the importance of an equal fructose/glucose balance and the deleterious effect of sorbitol.*

### **Better tolerance after recovery from diarrhea when drinking white grape juice**

- It is commonly observed that children whose GI tracts are compromised in some way (i.e. an infection causing diarrhea), are even more sensitive to juice choices than “normal” children.
- A study has shown that infants and toddlers tolerated white grape juice significantly better after a bout with diarrhea than either apple or pear juice.<sup>4</sup> During recovery from diarrhea, those who drank one serving of white grape juice produced one third the stool output of those drinking apple, and a quarter of those drinking pear. Also, pear and apple groups experienced a recurrence of loose stools while the white grape juice group did not.

*During the recovery period following diarrhea, white grape juice infants fared significantly better than those drinking apple juice, with less total stool output and fewer recurrences of diarrhea.*

### **Infants with a history of colic often have a harder time digesting certain juices**

- Duro and colleagues showed that young babies with a history of colic were more likely to re-experience colic symptoms after drinking apple juice than white grape juice.<sup>12</sup> The study looked at 30 children, ages 4-6 months, and found that those given 4 ounces of apple juice experienced more crying and restlessness and slept significantly less than those given white grape juice.

*Colic-like symptoms are actually much like those of carbohydrate malabsorption—including acute lower stomach pain, gas and bloating.*

### **Carbohydrate malabsorption may increase daily energy requirements in infants**

- In a study of 32 infants, aged 5-6 months, Valios and colleagues found that those who malabsorbed the carbohydrates of juice expended more energy for the next three hours than infants who tolerated the juice they were fed.<sup>13</sup> The authors also raised the possible correlation between malabsorption of carbohydrates and sub-par growth performance.

*The relationship between carbohydrate malabsorption and below-average growth performance could be due to decreased energy absorption and increased energy expenditure.*

**Symptoms of IBS may be alleviated by switching from apple to white grape juice**

- A study of 28 participants, ages 9 months to 18 years, found that 70% of the participants diagnosed with IBS-type symptoms who regularly drank more than 6 ounces of apple juice or pear nectar did not exhibit symptoms after consuming white grape juice instead for one year.<sup>14</sup>

*Even older children with a history of GI disorders can be sensitive to the carbohydrate composition of juices. Small dietary changes, like switching to white grape juice, can offer significant improvements.*

**Current juice guidelines and digestibility concerns**

- Clear juice can be an excellent complement to breast milk or formula in young children as early as 6 months of age. Decisions on how much juice to drink and when to introduce juice are best made in consultation between parents and pediatricians.
- The American Academy of Pediatrics (AAP) recommends limiting 100% juice consumption to 4–6 oz. per day for children one to six years old and 8–12 oz. per day for children 7–18 years old.<sup>15</sup>
- One of the reasons given by AAP is that carbohydrate malabsorption, with clinically undesirable consequences, may occur when the concentration of fructose exceeds that of glucose (as with apple and pear juices). AAP indicates that this malabsorption is not often seen with white grape juice.
- AAP does qualify this recommendation by stating that at 10 mL/kg of body weight, any juice is absorbed equally as well. For the majority of 12–24 month-olds this would equate to 3–5 oz. per day or less.
- It must be noted that average daily consumption of juices tends to hover at the high end of the recommended amounts (~ 6 oz. for under 5 years).<sup>16,17,18</sup> A considerable number of children are therefore consuming more than the recommended amounts and may therefore experience undesirable effects if fed juices with excess fructose and sorbitol.<sup>17</sup>

*At the lowest levels of consumption, the differences in digestibility of clear juices may not be discernible. However, for children—particularly toddlers—drinking more than 4 oz. per day, making the right juice choice is quite important.*

**Welch's 100% White Grape Juice:**  
*The clear choice for the whole family*

**Welch's 100% White Grape Juice, made from Niagara grapes, delivers superior antioxidant power**

- For many families, clear juices often become a household staple, present in the household and consumed by many family members, long after digestibility for young tummies may be an issue. Recent testing, performed by an independent laboratory, showed superior antioxidant capacity of Welch's 100% White Grape Juice, made with Niagara grapes, compared to over 50 other clear 100% juices tested – apple juices, other white grape juices, white cranberry juices and pear juices.<sup>19</sup>
- Like their purple cousins, the Concord grapes, Niagara grapes contain an abundance of potent antioxidants—natural plant compounds called flavonoids. Niagara grapes give Welch's 100% White Grape Juice an antioxidant boost vs. other clear juices.
- Growing evidence suggests that foods naturally rich in antioxidants may help reduce the risk of heart disease and certain cancers. An American Heart Association Science Advisory states that “the scientific evidence support recommending consumption of a diet high in food sources of antioxidants and other cardioprotective nutrients...to reduce the risk of heart disease”.<sup>20</sup>

*Antioxidant-rich Niagara grapes give Welch's 100% White Grape Juice more antioxidant power than other clear juices tested.*

**Welch's 100% White Grape Juice provides taste and nutrition for the whole family**

- Young children love the taste of Welch's 100% White Grape Juice (with no added sugar). Older children and adults often prefer the crisp, clean, pure taste of Welch's 100% White Grape Juice to apple juice.
- A 6 oz. glass of 100% White Grape Juice is an easy and delicious way to satisfy one serving of fruit toward the recommended 5-9A Day goal. Welch's 100% White Grape Juice is exactly that – 100% Juice that is all white grape with no apple juice or flavors added.
- Selecting Welch's 100% White Grape Juice made with Welch's own Niagara grapes ensures higher natural antioxidant power vs. other clear juices.

*Welch's 100% White Grape Juice is the gentle juice for infants and toddlers and its delicious taste and superior natural antioxidant power make it the clear choice among clear juices for the whole family.*



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**Proposed WIC Food Packages:  
Reconsideration of Juice Allowances**

**Presentation to OMB and OIRA**

**October 25, 2006**



## Encouraging Fruit & Vegetable Consumption

- Welch's is a cooperative of 1300+ grape grower-owners:
  - Fruit consumption is the heart of our business.
  - Active provider of 100% juices to the WIC program.
  - Support the addition of whole fruits and vegetables to the WIC food packages.
  - Encourage the moderate consumption of 100% juices to help us get more fruits and vegetables in our diets.



## Welch's and WIC

- Active in Program since 1982
- 18 Federally Eligible Products (46 and 64 Ounce RTS, Frozen Concentrates, Shelf Stable Concentrates)
- Sustaining Member of NWA since 1984
- \$6.9 million in Grants to State Programs 1989 – 90% used for Farmers Market Match funds
- Travel and Exhibit at 12 state training events annually



## 100% Juice Allowances – Time for the Right Change

- Welch's does agree that 100% juice package allowances can be reduced.
  - Disagree that *drastic* cuts in 100% juice allowances are the optimal means to encourage increased consumption of fruits and vegetables and better diets overall.
  - Propose that 100% Juice allowances be reconsidered.





## The Role of 100% Juices

- WIC participants need to increase fruit and vegetable consumption
  - 100% Juices are an important source of nutrients and phytonutrients and *do* count toward fruit and vegetable consumption.
  - 100% Juices provide *variety* and serve as an excellent *complement* to whole fruit and vegetable intake to help us get *more*.
  - *Moderate* intake of 100% Juices should be encouraged.



## 100% Juices an important source of micronutrients

- “Fruit juices provide substantial contributions of several vitamins and minerals in higher amounts than do whole fruits.”
  - Some of the most commonly consumed fruits – such as apples and bananas – are not rich in Vitamin C
  - WIC authorized 100% Juices offer an excellent source of Vitamin C
  - A modest amount of juice can provide adequate intake of Vitamin C
  - The proposed juice allowances for packages V-VII are expected to result in an increase in the percentage of participants with inadequate intake of vitamin C



## Lack of Scientific Link to Obesity

- The preponderance of scientific evidence does *not* support a link between moderate consumption of 100% Juice and overweight status.
- NHANES analysis suggests positive health and diet associations for 100% juice consumers.
- A drastic change in the 100% juice allowances inappropriately suggests that juice is “bad”.



## Trade-offs

- 100% juices provide a readily available nutritional option and is simply a great way to help us get more.
  - Shelf life
  - Storage
  - Preparation
- A severe reduction to the juice package could lead to substitution of lower-cost sweetened beverages.



## Welch's Key Points and Recommendations

- 100% Juice does count towards total fruit and vegetable consumption.
- Encourage moderate consumption of 100% juice as a complement to whole fruit and vegetable intake to help us get more.
- Ensure that maximum juice allowances take authorized package sizes into account.
- Ensure packages for women acknowledge that Vitamin C is a nutrient of concern and that intake is projected to be inadequate for many with the proposed juice allowances.
- Ensure that all children receiving package IV receive a minimum of 4 ounces of 100% juice.



## The WIC Package for Breast-feeding Women (VII)

- Agree the **current 288 ounce** allowance is high.
- The **proposed 144 ounce** allowance represents too drastic a cut (4.8 ounces per day).
- At this level, the percentage of participants predicted to receive inadequate intake of vitamin C is expected to increase by the IOM (52% per Appendix D).
- Welch's **proposes an allowance of 192 ounces**, in order to provide these women with about 6 ounces of juice per day.



## The WIC Package for Non-Breast feeding Women (VI)

- Agree the **current 192 ounce** allowance is high.
- The **proposed 96 ounce** allowance represents too drastic a cut (3.2 ounces per day).
- At this level, the percentage of participants predicted to receive inadequate intake of vitamin C is expected to increase by the IOM (47% per Appendix D).
- Welch's **proposes an allowance of 144 ounces**, in order to provide these women with a minimum of 4 ounces of juice per day, regardless of authorized container sizes.



## The WIC Package for Pregnant and Partially Breast-feeding Women (V)

- Agree the **current 288 ounce** allowance is high.
- The **proposed 144 ounce** allowance represents too drastic a cut (4.8 ounces per day).
- At this level, the percentage of participants predicted to receive inadequate intake of vitamin C is expected to increase by the IOM (44% per Appendix D).
- Welch's **proposes an allowance of 192 ounces**, in order to provide these women with about 6 ounces of juice per day.





## The WIC Package for Infants 6 months-11 months (II)

- The **current 96 ounce allowance** is appropriate for infants beginning at 6 months.
- The AAP states that up to 6 oz. is an appropriate amount of juice for daily consumption at this age.
- The **proposed allowance of no juice** may encourage the introduction of sweetened beverages rather than 100% juice in moderation.
- In practice, with a 96 ounce maximum allowance, states would be providing 64 – 96 ounces per month.
- Welch's proposes an **allowance of 96 ounces**, providing infants with 2.1-3.2 ounces per day.



## The WIC Package for Children aged 1-4.9 years of age (IV)

- Agree the **current 288 ounce** allowance is high.
- The AAP states that up to 6 oz. is an appropriate amount of juice for daily consumption at this age (**192 ounces**).
- The **proposed 128 ounce** allowance seeks to provide children with the minimum recommended amount (~4 oz./day) to supplement micronutrient intake.
- In practice, the vast majority of states would only be able to provide 92-96 ounces (less than 4 ounces) due to authorized package sizes.
- Welch's proposes a **revised allowance of at least 144 ounces** to provide these children with a minimum of 4 ounces per day.



## The maximum allowances must allow for container flexibility

- WIC authorized juice containers currently provide 46-64 oz. of juice in either ready-to-drink or concentrated form.
- USDA must consider maximum juice prescriptions which correspond with authorized package sizes.
- The proposed juice package allowances will result in under redemption in the majority of states.



## WIC's Education Function

- WIC packages should place a priority on whole fruit and vegetable consumption, while encouraging moderate consumption of juices.
- An important component of the WIC program is the educate participants as to the:
  - Proper role of 100% juices as part of a healthy diet.
  - Differences between 100% juices and sweetened beverages.



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October 24, 2006

Ms. Patricia Daniels  
Director, Supplemental Food  
Programs Division  
Food and Nutrition Service, USDA  
3101 Park Center Drive, Room 528  
Alexandria, VA 22302

*RE: Docket No. 0584-AD77; WIC Food Packages Rule*

Dear Ms. Daniels:

Welch's is a cooperative of over 1300 grower-owners and the world's leading producer of grape juice. We are an active provider in USDA's Special Supplemental Nutrition Program for Women, Infants and Children (WIC) nationwide. We support USDA's goal to revise WIC food packages to better reflect nutrition science and dietary recommendations. We are concerned, however, that there will be unintended consequences if USDA goes final with all of the provisions in its proposed rule<sup>1</sup> to drastically cut 100% juice in WIC packages. Accordingly, we respectfully submit these comments for your consideration.

USDA proposes cuts in the WIC allowances for 100% juice and other commodities to achieve cost neutrality for USDA's proposal to include fruits and vegetables in the program. In proposing these changes, USDA considered a report by the Institute of Medicine ("IOM"), WIC Food Packages: Time for a Change (2006). Welch's agrees with USDA and the IOM report that the WIC program should encourage greater consumption of *whole* fruits and vegetables, consistent with the new Dietary Guidelines for Americans and the FDA dietary guidance statement. Welch's is pleased that fruits and vegetables will be added to the WIC Food Packages. However, we respectfully submit that drastic cuts in 100% juices are not the best means to achieve the goal of increased consumption of fruits and vegetables overall or the most optimal WIC packages.

We agree that juice (like other foods) should not be over-consumed. The WIC program should promote the consumption of nutrient-rich and phyto-nutrient-rich 100% juices

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<sup>1</sup> "Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): Revisions in the WIC Food Packages," 71 Fed. Reg. 44,784 (Aug. 7, 2006).

in appropriate amounts to complement, not replace, whole fruits and vegetables. We agree with some of USDA's proposed juice cuts, which are consistent with the recommendations of the American Academy of Pediatrics ("AAP"). The proposed rule, consistent with the IOM Report, calls for the elimination of juice for infants 4 through 5 months old, and we agree that this is appropriate under the AAP guidelines. Rather than completely eliminating 100% juice for infants 6-11 months, USDA should maintain the modest amount of juice allowed in the current package (96 ounces monthly), as it represents a daily amount that is even below the amount AAP guidelines suggest is appropriate for this age (4-6 ounces).

For children 1-4.9 years old, we agree that the current WIC juice allocation (9.6 ounces daily) is high. The proposed rule calls for a reduced maximum allowance of 128 ounces, intending to provide children of this age about 4 ounces per day. While Welch's would certainly support a revised package allowance of 192 ounces which would provide children with an appropriate 6 ounces per day, we wish to acknowledge the fiscal constraints and instead can accept a revised package of 144 fl. oz. which would provide *all* children receiving the package with a minimum of 4 ounces, taking authorized container sizes into account. This amount is consistent with the AAP guidelines, and it would help ensure that children receive their daily value for vitamin C and other micronutrients.

For women receiving packages V-VII we recommend increases to the juice allowances given that vitamin C shortfalls are expected to increase for many participants. In short, for packages II and IV to VII, while we think it appropriate to reduce the current allowance in most cases, we think that USDA's 100% juice cuts are too severe. (See Appendix A). Concerns about over-consumption should not lead to drastic reductions in allowances for 100% juice. The right balance must be struck to achieve the optimum result.

### **The Role of 100% Juices**

The majority of Americans do not consume the recommended amounts of fruits and vegetables in their diets. While fruit and vegetable vouchers will assist in closing the fruit and vegetable consumption gap for WIC participants, 100% juices should continue to play a vital role in WIC participants' diets to assist in further closing that gap. 100% juices will provide important sources of nutrients and phytonutrients and will complement and add variety to fruit and vegetable consumption.

USDA is working as part of a National Partnership, led by the Produce for Better Health Foundation ("PBH") and the Centers for Disease Control, to increase American's consumption of fruits and vegetables. The goal is to reposition consumers' attitudes towards fruits and vegetables from "I should" to "I want to." One of the core messages in this effort emphasizes that all product forms count towards getting more fruits and vegetables in our diet – fresh, frozen, canned, dried and 100% juice. How will USDA effectively partner with PBH to broadly communicate this message if

USDA's WIC packages do not support that all forms, including 100% juice, count toward getting more fruits and vegetables into our diets?

The preamble to the proposed rule states that the American Academy of Pediatrics "notes that juice does not provide any added nutritional benefit beyond that of whole fruit." 71 Fed. Reg. at 44,802. In fact, 100% juices can provide a much-needed variety of nutrients and phytonutrients that are not often represented in the whole fruits consumed. For example:

- Just 4 ounces of Welch's 100% Grape Juice made from Concord grapes counts as a ½ cup serving of phytonutrient rich purple fruit. The Produce for Better Health Foundation reports that purple and blue fruits and vegetables are significantly underrepresented in the American diet, representing only 3% of all fruits and vegetables consumed.<sup>2</sup>
- The most commonly consumed fruits, apples and bananas, do not provide an adequate intake of vitamin C, which 100% juice can provide. In fact, the reductions to the 100% juice allowances for packages V, VI and VII are expected to increase the percentage of participants predicted to receive inadequate levels of vitamin C intake (see IOM report Appendix D).
- The 2005 Dietary Guidelines Advisory Committee Report, the scientific foundation of the 2006 Dietary Guidelines for Americans, states that "Fruit juices provide substantial contributions of several vitamins and minerals in higher amounts than do whole fruits." Appendix G-2, p. 33. With the exception of fiber, these include vitamin C, potassium, and magnesium. The Report also states, "The fruit juices most commonly consumed by older children and adults provide more vitamin C, folate, and potassium in portions usually consumed than do the commonly eaten fruits." Part D, p. 16. Calcium and potassium were identified as priority nutrients for women in the proposed WIC rule, and potassium was identified as a priority nutrient for young children. See 71 Fed. Reg. at 44,788

For determining reductions in other commodities, it is not clear how USDA has considered whether there is a real need (e.g., to close the gap on needed nutrients) or whether those commodities have unhealthy attributes such as saturated fat and cholesterol. See IOM Report, at p. 82, Table 3-2; 71 Fed. Reg. at 44,789, Exhibit B.

### **Lack of Scientific Link to Obesity**

One justification for cutting 100% juice is its purported link to obesity. In fact, the preponderance of the scientific evidence does not support a link between 100% juice consumption and overweight status in children or adults. Many recent research studies have examined the potential relationship between 100% juice consumption and body weight. Among the studies which are specific to 100% juice consumption, most

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<sup>2</sup> NPD Group, "State of the Plate: Study on America's Consumption of Fruits and Vegetables," Produce for Better Health Foundation (Apr. 2003).

find no association between overweight status and the daily consumption of up to 12 ounces of 100% juice. (See, e.g., Attachment B).<sup>3</sup>

In April 2006, an analysis of the Department of Health and Human Services' NHANES database was presented at the Experimental Biology 2006 meeting. This analysis showed positive health and diet associations for those children consuming 100% juice versus those who did not. Children who drank 100% juice had healthier overall diets than non-juice consumers and consumed more total fruits, fiber and key nutrients such as vitamin C, potassium, magnesium and folate. The juice consumers also had significantly lower intakes of total fat, saturated fat and sodium. According to the researchers, the group of 100% juice consumers also had equal or lower bodyweights and body mass indexes ("BMI") than non-juice consumers, adding to the scientific evidence which shows that 100% play a role in a healthful diet and are not associated with being overweight.

We do agree that the current juice allowance for WIC package IV in particular encourages greater consumption of juice than is recommended for this age. We propose, however, that drastic cuts to below the recommended consumption levels are not the best means to encourage consumption in moderation. We recommend that juice allowances provide all children with 4-6 ounces of 100% juice per day, the amount recommended as appropriate for this age.

### Trade-offs

100% juices provide a readily available nutritional option for WIC participants who often face constraints for transportation, storage, and time. Juice does not have the limited shelf life and preparation demands of fresh produce and can simply be a great way to get *more* fruits and vegetables in the diet.

Moreover, a severe reduction in 100% juice could lead to the substitution of lower-cost sweetened juice and non-juice beverages that do not have the nutritional benefits of 100% juice and that do have a strong link to obesity and other health problems. For example, many parents have positive experiences introducing babies to 100% juice. Eliminating juice for babies 6-11 months could lead parents to substitute cheaper sweetened beverages, an unhealthy alternative. Alternatively, if USDA simply eliminates 100% juice from WIC packages for babies 6-11 months, parents could feed too much juice to their infants. The optimal policy is to provide a healthy amount of 100% juice in the WIC package and to provide nutritional education to promote proper consumption and healthy choices.

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<sup>3</sup> On this point, the IOM report was tenuous, stating: "*Some evidence suggests that reducing consumption of sweet drinks, including pure juice, may be helpful in managing the body weight of preschool children.* (p. 116) (emphasis added). However, the IOM report also noted that the task of the Committee was only to evaluate "one component of the WIC program, the food packages that are supplied to participants, and determine if revisions were needed." (p. x). In designing an optimal WIC program, the key role of nutritional education should be considered to address any concerns about juice without foregoing its significant benefits.



## **Importance of WIC's Educational Function**

Nutritional education has been a key service of the WIC program. The education of WIC participants as to the proper role of 100% juices as part of a healthy diet is an important program component. WIC can help participants to understand:

- 100% juices are an excellent way to add a variety of nutrients and phytonutrients into the diet.
- 100% juices (consumed in moderation) are an excellent way to complement, not replace, whole fruit and vegetable intake
- Differences between 100% juices and sweetened beverages and their very different roles in a healthy balanced diet.
- 100% juices have a shelf life to serve participants daily for the full duration of the monthly food package.

The appropriate consumption of 100% juice has **not** been linked to obesity. To severely reduce the amount of juice in the WIC food packages inappropriately suggests that juice is "bad" and increases one's risk for obesity or diabetes. This sends the wrong message to the public, and it is a missed opportunity to educate consumers in an area fraught with confusion.

The WIC packages should place a priority on whole fruit and vegetable consumption, while encouraging the **moderate** consumption of juices to complement, not replace, whole fruit and vegetable consumption. Appropriate levels of juice in the package allow an opportunity to counsel against over-reliance on juice and alert participants about the difference between 100% juice and sweetened beverages. The food packages must encourage participants to look at foods for the health and nutritional benefits they provide (e.g. variety of phytonutrients, supplemental micronutrients) in addition to delicious taste and energy calories. Participants can learn which juices may best supplement their family's fresh fruit and vegetable consumption. It is critical for the WIC program to educate participants that "more matters" when it comes to fruit and vegetable consumption, and that fresh, frozen, canned, dried, and 100% juices all count towards overall daily fruit and vegetable consumption.

## **The Need for Container Flexibility**

The proposed regulation for Food Package IV, the "Children's" package for ages one to five, prescribes a maximum of 128 ounces of juice. This will lead to significant under-redemption of the juice prescription. Presently, 7 CFR 266.10 stipulates 276 ounces of single strength juice and 288 ounces of reconstituted juice. These are multiples of 46 and 48, respectively. Single strength juice in 46 ounce containers is the authorized container in 47 states, excluding Mississippi, which only authorizes aseptic concentrates, as well as California and Nevada, which solely authorize 64 ounce containers. Forty nine states authorize concentrates (frozen and shelf stable) that reconstitute to 48 ounces; the exception is Mississippi. Territorial and Native

American programs are typical with most states for ready to drink single strength and concentrate authorizations.

Meaningful juice allowances depend on container flexibility. We urge USDA to consider maximum juice prescriptions that consider the authorized container sizes. The proposed 100% juice allowance for package IV at 128 ounces is intended to provide young children with the minimum recommended daily amount of about 4 ounces. However, since the vast majority of states authorize only 46 and 48 ounces containers, participants in these states will not receive this minimum amount, resulting in monthly under-redemptions of 36 and 32 ounces, respectively. We proposed as alternative juice allowance of at least 144 ounces which ensures that all package IV participants receive the minimum 4 ounces per day.

Welch's currently is authorized to provide 100% juices in shelf-stable bottled, canned or concentrate form, as part of the WIC food packages in 48 states, nearly all of the 33 Native American Programs, and six Federal Territories. Welch's offerings for WIC include 64- and 46-ounce ready-to-serve purple and white grape juice, as well as six varieties of frozen purple, white and white grape based blended concentrates, and eight flavors of shelf-stable concentrates, which reconstitute to 48 ounces.

Two states to date have opted to authorize 64 ounce container sizes. We would propose that maintaining the smaller container sizes of 46-48 ounces is consistent with a policy designed to encourage moderate consumption of juice that provides an excellent complement to whole fruit and vegetable consumption.

Sincerely,



Nicholas A. Pyle, Government Relations  
Welch's

**ATTACHMENT A:  
USDA Cuts in 100% Juice<sup>4</sup> and Proposed Alternatives**

**WIC Food Packages: Maximum Monthly Allowances for 100% Juice by Food Package**

	<u>WIC Current Rule</u>	<u>IOM / WIC Proposed Rule</u>	<u>AAP Guidelines</u>	<u>Welch's</u>
<b>Food Package II</b>				
100% Juice allowance (Vitamin C rich juice)	<b>96 fl oz</b> (about 3.2 ounces per day)	<b>no juice</b>	<b>120-180 fl oz.</b> (4-6 ounces per day)	<b>96 fl oz</b> (~2.1-3.2 ounces per day)
Eligibility	4-11 months	6-11 months	6-11 months	dependent upon authorized container sizes
<b>Food Package IV</b>				
100% Juice allowance (Vitamin C rich juice)	<b>288 fl oz</b> (about 9.6 ounces per day)	<b>128 fl oz.</b> (about 4.3 ounces per day)	<b>120-180 fl oz.</b> (4-6 ounces per day)	<b>144 fl. oz</b> (~4.3-4.8 ounces per day)
Eligibility	1 through 4.9 years	1 through 4.9 years		dependent upon authorized container sizes
<b>Food Package V</b>				
100% Juice allowance (Vitamin C rich juice)	<b>288 fl oz</b> (about 9.6 ounces per day)	<b>144 fl oz.</b> (about 4.8 ounces per day)		<b>192 fl. oz.</b> (~6.4 ounces per day)
Eligibility	Pregnant and Breastfeeding	Pregnant and Partially Breastfeeding		
<b>Food Package VI</b>				
100% Juice allowance (Vitamin C rich juice)	<b>192 fl oz</b> (about 6.4 ounces per day)	<b>96 fl oz.</b> (about 3.2 ounces per day)		<b>144 fl. oz</b> (~4.3-4.8 ounces per day)
Eligibility	Nonbreastfeeding postpartum	Postpartum Mothers not breastfeeding		dependent upon authorized container sizes
<b>Food Package VII</b>				
100% Juice allowance (Vitamin C rich juice)	<b>288 fl oz</b> (about 9.6 ounces per day)	<b>144 fl oz.</b> (about 4.8 ounces per day)		<b>192 fl. oz.</b> (~6.4 ounces per day)
Eligibility	Breastfeeding/No Formula	Postpartum Breastfeeding Mothers up to 12 months		

<sup>4</sup> See Proposed Rule, 71 Fed. Reg. at 44,801-02.

**ATTACHMENT B:**  
**Highlights of Scientific Research on 100% Juice Consumption and its Potential Impact on Bodyweight**

There are some general misconceptions about the appropriateness of 100% fruit juices as part of the diet, especially children's diets. The truth is that scientific research does not support a link between 100% fruit juice consumption and overweight status in children or adults.

A number of recent research studies have been conducted that look at a possible relationship between 100% juice consumption and its potential impact on body weight. Of the studies which are specific to 100% juice consumption and overweight status, most find no connection with consumption up to 12 ounces per day.

Highlights from recent studies can be found below (and does not include the research data presented at the Experimental Biology 2006 meeting; that information is provided separately).

**Alexy U, Sichert-Hellert W, Kersting M, Manz F, Schoch G. Fruit juice consumption and the prevalence of obesity and short stature in German preschool children: results of the DONALD Study. Dortmund Nutritional and Anthropometrical Longitudinally Designed. J Pediatr Gastroenterol Nutr. 1999;29:343-349.**

Designed to look at a possible association between excessive consumption of fruit juice (more than 12 ounces per day) and short stature and obesity, data were collected and evaluated on 205 children 3-5 years of age from the DONALD study. Of the 38 children who consumed more than 12 ounces daily, as shown on at least one of their three food diaries, none were obese or short, even though the juice supplied as much as 19 percent of calories. The researchers concluded, "Even children with repeatedly excessive fruit juice consumption over three years were neither obese nor short, and their growth velocity was normal." They also state that they agree with others that any single food in excess can be detrimental but that "people must learn that a single food (e.g., fruit juice) is not healthy or unhealthy, but that the total composition of a diet must be balanced."

**Dennison, BA, Rockwell, H., Baker, S. Excess Fruit Juice Consumption by Pre-school aged Children is Associated with Short Stature and Obesity. Pediatrics. January 1997; 99:15-22.**

In this cross-sectional study of 168 children, fruit juice consumption among children (two year olds and five year olds) was evaluated over seven days with mean consumption being 5.9 ounces (2 year olds) and 5.0 ounces (5 year olds). The researchers stated that 10 of the 19 children who drank 12 ounces or more daily had BMIs greater than 75<sup>th</sup> percentile. They similarly found that 47 out of 149 children who drank less than 12 ounces per day had similarly high BMIs. **The researchers do not suggest that children quit drinking juice; rather, they state that until more definitive research is done, it seems prudent for parents and caregivers to limit juice to no more than 12 ounces daily. Those who consumed the most 100% juice also had lower intakes of total fat, saturated fat and cholesterol than those who did not drink juice. Moreover, the researchers acknowledge that this cross-sectional study does not demonstrate causality and that further study in this area is warranted.**

**Dennison, BA, Faith, M., Edmunds, L., Stratton, H. Fruit Juice Intake Predicts Increased Adiposity Among Low-Income Children. NAASO: The Obesity Society. Abstract. October 17, 2005. (unpublished study)**