OJ Nutrition
TELLING THE
100% STORY
Dear Health Professional,

The Florida Department of Citrus knows that you are a trusted and valued source of information about food and health for consumers who want to lead healthier, more active lives. And at a time of growing concern about the health and weight of the nation’s citizens, promoting a healthy eating pattern that focuses on choosing nutrient-dense foods and beverages within calorie needs has never been more important.

Consuming nutrient-dense beverages such as 100% orange juice can help children and adults meet both food group and nutrient intake recommendations as outlined by the USDA Dietary Guidelines for Americans and MyPlate. One hundred percent orange juice can be part of a healthful diet to promote nutrient adequacy and improved diet quality, and 100% orange juice consumption has been associated with beneficial effects on certain health markers.

Unfortunately, media frequently reports misinformation about 100% orange juice and the sugar naturally present in orange juice, which can cause consumer confusion and uncertainty about the healthfulness of consuming 100% orange juice. We have developed an “OJ Nutrition and Health Toolkit” to provide you with facts about the nutrition and health benefits of 100% orange juice that can be shared with your patients and clients. The Toolkit includes the following:

- **Key Research Findings Support the Role of 100% OJ in a Healthy Diet**: Highlights and references scientific support and clinical study/research findings that document the nutrition and health benefits of consuming 100% orange juice.
- **Make It Count – The Facts About 100% Orange Juice and Fruit Intake**: Illustrates the role of 100% orange juice as a complement to whole fruit in helping Americans meet daily fruit intake recommendations.
- **Squeeze the Most out of Beverages with Nutrient-Dense 100% Orange Juice**: Outlines the nutrient contributions of 100% orange juice to the diets of adults and children.

We hope the information in this Toolkit will assist you in providing sound and evidence-based advice to your clients and patients about consuming 100% orange juice as part of a healthful diet. We also invite you to visit FloridaJuice.com for the latest science-based information and resources. Please feel free to contact us at ojnutritioninfo@citrus.state.fl.us.

Sincerely,

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The increasing prevalence of obesity among children and adults has focused attention on beverage consumption in the U.S. diet. Nutrient-dense beverages, such as 100% orange juice, can be part of a healthful diet to promote nutrient adequacy and improved diet quality, and have been associated with beneficial effects on certain health markers. Unfortunately, media frequently reports misinformation about 100% orange juice and the sugar in orange juice, which can cause consumer confusion and uncertainty about the healthfulness of consuming 100% orange juice.

This fact sheet highlights key clinical and epidemiological research findings related to 100% fruit juice and orange juice consumption and several major health concerns, including overweight/obesity, heart disease risk factors (blood lipids), insulin resistance/metabolic syndrome and diabetes. There is substantial evidence that the consumption of moderate amounts of 100% orange juice is associated with beneficial or no adverse effects on key health indicators and little evidence to support negative impacts of orange juice or its sugars on these health concerns.

OVERWEIGHT & OBESITY

The preponderance of epidemiological studies report no association between higher intakes of 100% orange juice or 100% fruit juice and increased body weight, body mass index (BMI) or other weight indicators in children or adults. There are no known studies that specifically associate 100% orange juice intake with increased risk for overweight/obesity.

- Clinical studies in adults report no adverse effects on body weight or BMI when orange juice is included as part of the diet.¹⁻³
- A systematic review of the association between 100% fruit juice intake and weight in children and adolescents reported that after assessing 21 cross-sectional and longitudinal studies, a majority found no association between 100% juice intake and adiposity - even when juice was consumed in amounts exceeding current recommendations.⁴
- Epidemiological studies report no association between 100% orange or citrus juice intake and body weight, BMI, or changes in BMI over time in children or adolescents.⁵⁻⁸
- Epidemiological studies report that 100% orange juice or 100% fruit juice consumption by adults was associated with lower body weight or BMI, or lower risk for overweight/obesity compared to no consumption.⁸⁻¹⁰

* Daily consumption of 500-750 mL (approximately 17-25 ounces) for at least 4 weeks.

“Notably, consumption of 100% OJ at current levels was not associated with body weight or adiposity parameters, including WC [waist circumference], or an increased risk of overweight or obesity in children.”⁷

“OJ consumption was associated with healthier body composition (lower BMI, WC [waist circumference] and body fat %) in adults, and there were no significant associations between OJ consumption and body composition in children and adolescents.”⁸

“...it appears that 100% fruit juice, given its nutrient profile and naturally occurring carbohydrate, may be a prudent choice toward building a healthy diet.”⁹

“Inclusion of fruit juice, in amounts consistent with dietary recommendations, as part of a healthy diet can provide important nutrients without increasing weight in children.”¹¹

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O’Neil et al. Nutrition Research
Wang et al. Public Health Nutrition
Pereira et al. J Am Coll Nutr
O’Neil et al. Am J Health Promot
HEART DISEASE RISK FACTORS (BLOOD LIPIDS)

Clinical and epidemiological studies suggest beneficial effects of 100% orange juice or 100% fruit juice consumption on blood lipids.

- Clinical studies report significant decreases in total and low density lipoprotein (LDL) cholesterol with the consumption of 100% orange juice by study participants.1
- A clinical study reported significant decreases in triglycerides (TG) in male participants with the consumption of 100% orange juice.1-2

“Based on the results of this study, daily consumption of pasteurized orange juice may improve biochemical and clinical characteristics such as dyslipidemia, insulin resistance, systemic hypertension and abdominal fat, thereby reducing the risk of cardiovascular diseases and diabetes.”1

Basile et al. Proc Fla State Hort Soc

“Orange juice presented cholesterol-lowering activity and the association between citrus flavonoids and vitamin C may prevent oxidative stress and the development of atherosclerosis.”12

Cesar et al. Rev Nutr

DIABETES

Epidemiological studies suggest no association between 100% citrus or fruit juice intake and risk of diabetes.

- Clinical studies report no adverse effects on total or LDL cholesterol with the consumption of 100% orange juice.***
- A study of National Health and Nutrition Examination Survey (NHANES) data reported lower LDL cholesterol and no difference in TG in children who consumed 100% orange juice compared to non-consumers.7

“Interestingly, orange and grapefruit juice consumption was not associated with an increased risk of diabetes in our study, perhaps because these beverages are typically consumed as part of a meal rather than between meals. The naturally occurring sugars in orange and grapefruit juices (glucose and fructose) may also have different metabolic effects than the high fructose corn syrup that is added to soft drinks.”16

Palmer et al. Arch Intern Med

“Fruit juice consumption was not associated with diabetes risk in our study, which suggests that naturally occurring sugars in beverages may have different metabolic effects than added sugars.”18

Schulze et al. JAMA

“Fruit juice also contains antioxidants, such as flavonoids, which may improve long-term insulin sensitivity by reducing inflammation.”17

de Koning et al. Am J Clin Nutr

100% fruit juice consumption was not associated with diabetes risk in large cohort studies of healthy men17 or middle-aged women.18

100% fruit juice consumption was not associated with diabetes risk in a large cohort of men and women in Japan19 or in a Japanese-Brazilian population.20
INSULIN RESISTANCE & METABOLIC SYNDROME

Clinical and epidemiological studies suggest no adverse effects of 100% orange juice or fruit juice consumption on various markers of glucose metabolism, insulin resistance or metabolic syndrome.

- Clinical studies report a decrease in fasting glucose with 100% orange juice consumption by men and no adverse effect of 100% orange juice consumption on plasma glucose or insulin levels in study participants.*3,12
- A clinical study reports that 100% orange juice consumption did not adversely affect several markers of metabolic syndrome including HOMA-IR* and body composition in study participants**.21
- In an epidemiological study, blood glucose and insulin levels did not differ between children and adolescents who consumed 100% orange juice and those who didn’t.7
- Consumption of 100% fruit juice was associated with lower HOMA-IR†, a marker for insulin resistance, in an analysis of NHANES data although the association was attenuated when taking into account multiple lifestyle factors.9
- Consumption of fruit juice was not associated with the risk of metabolic syndrome or high fasting glucose in young adults.15

* Daily consumption of 500-750 mL (approximately 17-25 ounces) for at least 4 weeks.
** Daily consumption of 250 mL (approximately 8 ounces) for 12 weeks.
† HOMA-IR (Homeostatic Model Assessment – Insulin Resistance) is a method used to estimate insulin resistance using the equation HOMA-IR = (plasma insulin x plasma glucose) / 22.5. Higher HOMA-IR values indicate increased insulin resistance.

“Since consumption of orange juice has been associated with better lipid and glycemic profiles, orange juice may possess functional potential to fight atherosclerosis and diabetes.”1

“In conclusion, we found that moderate intake of 100% fruit juice intake is associated with healthful lifestyles compared with no consumption of 100% fruit juice, and 100% fruit juice consumers are at lower risk for obesity and metabolic syndrome compared with nonconsumers.”9

REFERENCES

9. Pereira MA and Fulgoni VL 3rd. Consumption of 100% fruit juice is associated with lower HOMA-IR†, a marker for insulin resistance, in an analysis of NHANES data although the association was attenuated when taking into account multiple lifestyle factors.9
With the recent increase in media coverage about the role of beverages in health, consumers continue to be challenged to make informed beverage choices. With so many products available, it is important to know that naturally nutrient-dense beverages, such as 100% orange juice, can and should be part of a healthful diet.
Americans look for guidance in making healthful beverage choices, and 100% orange juice is naturally nutrient-dense and a healthy beverage option with no added sugars. The 2010 Dietary Guidelines for Americans recognize that 100% fruit juice supplies a substantial amount of nutrients along with the calories they contain, and include 100% juice as a complement to whole fruit to meet fruit intake needs.1 According to the Guidelines, the majority of fruit recommended should come from whole fruits, but when juices are consumed, 100% juice should be encouraged.

“Choose water, fat-free milk, 100% fruit juice, or unsweetened tea or coffee as drinks rather than sugar-sweetened drinks.” - 2010 Dietary Guidelines for Americans

FRUIT CONSUMPTION IN AMERICA

Few Americans consume the recommended amounts of fruit each day. According to the 2010 Dietary Guidelines for Americans, Americans consume only 42 percent of the recommended intake for fruits, and a study using National Health and Nutrition Examination Survey (NHANES) data reports 80 percent of the U.S. population have mean usual intakes of fruit that fall short of daily recommendations.1,2

FRUIT CONSUMPTION GAPS 3

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>AGE RANGE</th>
<th>TOTAL FRUIT INTAKE MEAN (CUP EQUIVALENTS)</th>
<th>FRUIT INTAKE GOALS/GOAL RANGES (PER USDA MYPLATE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>1-3</td>
<td>1.5</td>
<td>1 cup (for ages 2-3)</td>
</tr>
<tr>
<td>Children</td>
<td>4-8</td>
<td>1.1</td>
<td>1 - 1 ½ cups</td>
</tr>
<tr>
<td>Males</td>
<td>9-13</td>
<td>1.0</td>
<td>1 ½ cups</td>
</tr>
<tr>
<td>Females</td>
<td>9-13</td>
<td>1.0</td>
<td>1 ½ cups</td>
</tr>
<tr>
<td>Males</td>
<td>14-18</td>
<td>1.0</td>
<td>2 cups</td>
</tr>
<tr>
<td>Females</td>
<td>14-18</td>
<td>0.8</td>
<td>1 ½ cups</td>
</tr>
<tr>
<td>Males</td>
<td>19+</td>
<td>1.1</td>
<td>2 cups</td>
</tr>
<tr>
<td>Females</td>
<td>19+</td>
<td>1.0</td>
<td>1 ½ cups - 2 cups</td>
</tr>
</tbody>
</table>

One glass of 100% orange juice is a convenient and easy way to complement whole fruit intake, help meet daily fruit intake recommendations and help fill nutrient gaps. One 8-ounce glass is a good source of potassium and folate and an excellent source of vitamin C – three important nutrients underconsumed in the United States.1 And 100% orange juice is more nutrient-dense than many commonly consumed 100% fruit juices.4

100% ORANGE JUICE & DIETARY GUIDELINES FOR AMERICANS

Only children under age nine are eating enough fruit.
100% ORANGE JUICE AND USDA MYPLATE

USDA MyPlate recognizes that any fruit or 100% fruit juice counts as part of the Fruit Group. Fruits may be fresh, canned, frozen, or dried, and may be whole, cut-up, or pureed.

Each 8-ounce glass counts as one cup of fruit from the MyPlate Fruit Group.

DAILY FRUIT INTAKE RECOMMENDATIONS

<table>
<thead>
<tr>
<th>CHILDREN</th>
<th>2-3 years old</th>
<th>1 cup</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4-8 years old</td>
<td>1 - 1½ cups</td>
</tr>
<tr>
<td>GIRLS</td>
<td>9-13 years old</td>
<td>1 ½ cups</td>
</tr>
<tr>
<td></td>
<td>14-18 years old</td>
<td>1 ½ cups</td>
</tr>
<tr>
<td>BOYS</td>
<td>9-13 years old</td>
<td>1 ½ cups</td>
</tr>
<tr>
<td></td>
<td>14-18 years old</td>
<td>2 cups</td>
</tr>
<tr>
<td>WOMEN</td>
<td>19-30 years old</td>
<td>2 cups</td>
</tr>
<tr>
<td></td>
<td>31-50 years old</td>
<td>1 ½ cups</td>
</tr>
<tr>
<td></td>
<td>51+ years old</td>
<td>1 ½ cups</td>
</tr>
<tr>
<td>MEN</td>
<td>19-30 years old</td>
<td>2 cups</td>
</tr>
<tr>
<td></td>
<td>31-50 years old</td>
<td>2 cups</td>
</tr>
<tr>
<td></td>
<td>51+ years old</td>
<td>2 cups</td>
</tr>
</tbody>
</table>

Note: These amounts are appropriate for individuals who get less than 30 minutes per day of moderate physical activity, beyond normal daily activities. Those who are more physically active may be able to consume more while staying within calorie needs.

“Most people benefit from eating more fruits and vegetables every day. All forms count: fresh, frozen, canned, dried, and 100% juice.”

—Produce for Better Health Foundation

“Inclusion of fruit juice, in amounts consistent with dietary recommendations, as part of a healthy diet can provide important nutrients without increasing weight in children.”

—O’Neil et al. American Journal of Health Promotion

“Health professionals should encourage replacement of less nutritious beverages with those that are more nutrient-dense or represent more healthful choices such as milk, water, or 100% fruit juice.”

—Rampersaud et al. Journal of the American Dietetic Association
Researchers who analyzed data from 2003-2006 NHANES found children who regularly consume 100% orange juice tended to have significantly higher intakes of vitamin C, potassium, vitamin B6, folate, dietary fiber and magnesium than non-consumers. In addition, diet quality (as measured by the Healthy Eating Index (HEI-2005)) was significantly higher in those children consuming 100% orange juice than in non-consumers, as was intake of total fruit, fruit juice and whole fruit. Also, data suggest that drinking 100% orange juice is not linked to decreased milk consumption in children, and milk and 100% fruit juice have been found to be complements in children’s diets.

One hundred percent orange juice can help children get the nutrients they need and help meet fruit intake recommendations. The American Academy of Pediatrics (AAP) recommends that pediatricians should routinely discuss the use of fruit juice and fruit drinks/beverages and should educate parents about the difference between the two. The AAP makes the following recommendations regarding limits for daily intake of 100% fruit juice:

<table>
<thead>
<tr>
<th>AGE</th>
<th>OUNCES OF 100% JUICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-6</td>
<td>4-6 ounces</td>
</tr>
<tr>
<td>7-18</td>
<td>8-12 ounces</td>
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**REFERENCES**

One hundred percent orange juice is a natural source of essential vitamins and minerals needed for good health, and phytochemicals that may be beneficial to improving health. Research suggests adults and children who consume 100% orange juice tend to have better overall diet quality and nutrient adequacy as compared to those who don’t consume 100% orange juice.\(^1\)\(^4\)

Specifically, data from the 2003-2006 National Health and Nutrition Examination Survey (NHANES) suggests that both adults and children ages two and older who consume 100% orange juice tend to have significantly greater intake of several key nutrients typically underconsumed by Americans than those who don’t consume orange juice, including vitamin C, folate, magnesium, and potassium.\(^1\)\(^4\)

One 8-ounce glass of 100% orange juice helps to fill nutrient gaps and provides an excellent source of vitamin C and a good source of potassium and folate. And, 100% orange juice has no added sugars, sodium, cholesterol or saturated fat.

* Source: USDA National Nutrient Database for Standard Reference, Release 21. NDB 09209. Accessed 10/21/2008. This NDB was missing a value for sugars, therefore sugars amount taken from NDB 09215 – orange juice, frozen concentrate, unsweetened, diluted with 3 volume water. Calcium amount for calcium-fortified orange juice taken from NDB 09210 – orange juice, chilled, includes from concentrate, fortified with calcium and vitamin D (range from USDA database Releases 20 and 21). Calculated Daily Value (DV) percentages rounded to nearest whole percent. FDA rounding rules for nutrition labeling not applied when calculating percent DV. Percent Daily Value based on a 2,000 calorie diet. Abbreviations: mcg=micrograms; mg=milligrams; IU=International Units.
**Vitamin C (137% Daily Value)** is a water-soluble vitamin that may help support a healthy immune system. Vitamin C can help collagen production which is important for maintenance of healthy skin, bones, cartilage, muscle and blood vessels.

**Thiamin (18% Daily Value)** is a water-soluble vitamin associated with the action of many enzyme systems and helps the body process energy from the food we eat.

**Potassium (14% Daily Value)** is a mineral important for muscle function, nerve transmission, pH maintenance (acid/base balance), and maintaining fluid and electrolyte balance. Potassium may play an important role in cardiovascular health. Diets containing foods that are a good source of potassium and low in sodium may reduce the risk of high blood pressure and stroke.5

**Folate (11% Daily Value)** is a water-soluble vitamin that is important for cell division and the production of healthy red blood cells. Folate is essential for growth and development and, when consumed by women of childbearing age, may help reduce the risk of having a child with birth defects of the brain and spinal cord, known as neural tube defects.

**Magnesium (7% Daily Value)** is a mineral that is a mineral that helps the body generate energy from the foods we eat and is required for the action of many enzyme systems. Diets rich in fruits and vegetables that provide key minerals such as potassium, calcium, and magnesium may help contribute to the maintenance of healthy blood pressure.6 Magnesium may play an important role in bone health, so diets rich in foods with magnesium, such as fruits and vegetables, can help optimize the intake of micronutrients required for bone health.7

**Vitamin B6 (7% Daily Value),** known as pyridoxine, is a water-soluble B vitamin that helps the body process protein and carbohydrates in food. Vitamin B6 helps produce hemoglobin, a part of red blood cells that carries oxygen to all parts of the body.

**Vitamin A (4% Daily Value)** is a fat-soluble vitamin that’s important for good vision and a healthy immune system, and helps form and maintain healthy skin, teeth, skeletal and soft tissue and mucus membranes.

**Niacin (3% daily value)** is a water-soluble B vitamin that helps enzymes process carbohydrates and fats into energy the body can use.

**Calcium (3% Daily Value for non-fortified, 35%-50% Daily Value for fortified)** is a mineral that aids in maintaining bone health, bone and tooth development, blood pressure regulation and muscle function.

**Iron (2% Daily Value)** is a mineral needed for formation of blood cells and many proteins in the body.

**Phytochemicals** are plant compounds that may provide health-promoting benefits other than those associated with the need for essential nutrients. Although many plants and fruits contain phytochemicals, research is still defining the beneficial roles these components play. Examples of phytochemicals include flavonoids and carotenoids. Hesperidin is the most common flavonoid found in 100% orange juice, which is the only fruit juice or commonly consumed food that contains significant amounts. Emerging research suggests hesperidin may help maintain healthy blood pressure and blood vessel function, two of the key elements in the development of cardiovascular disease.8 100% orange juice contains the carotenoid beta-cryptoxanthin, and is one of the main contributors of beta-cryptoxanthin in the U.S. diet.9

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**REFERENCES**
