

Current Knowledge on Soy and Children's Diets



Prepared for:



*A farmer led organization comprised of 62 farmer directors,
USB oversees the investments of the soybean checkoff on behalf of all US soybean farmers.*

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Table of Contents

	<u>Page</u>
Executive Summary	2
I. Current Trends in Children’s Health	3
<i>Table 1: Prevalence of overweight among children and adolescents</i>	4
II. What do Children Eat?	6
Healthy soy choices.....	7
<i>Table 2: Nutritional profile of soyfoods</i>	9
III. Research on Soy and Children’s Diets	10
Consumption of soy during infancy and childhood.....	10
<i>Figure 1: Percentage of American children consuming soyfoods</i>	11
Acceptance of soy by children and preschoolers.....	11
Health effects of soy on infants, children and adolescents.....	11
Soy and infant health.....	11
Soyfoods during childhood and adolescence.....	12
Safety of soy for children.....	14
IV. Role of Soy in Federal Child Nutrition Programs	15
Soy in USDA meal patterns.....	15
<i>Table 3: Crediting Soy in the Child Nutrition Programs</i>	16
V. References	18

Executive Summary

Diversity – of race, ethnicity, culture, religion, and food preferences – characterizes the population in the United States and those served by food assistance programs today. This is particularly evident in children enrolled in the federal Child Nutrition Programs, who require a variety of food choices to meet their increasingly assorted dietary needs. Fortunately, there are many U.S. Department of Agriculture (USDA)-approved foods available to help child care and school foodservice providers accommodate the cultural, religious and health needs of all children who use these programs.

Today's children also face a growing list of health issues. Rising rates of childhood obesity, especially in racial/ethnic minority populations, has led to increasing numbers of children suffering from hypertension, type 2 diabetes, and high blood cholesterol. Excessive calorie consumption appears to be a major factor of many of these health conditions. Poor dietary choices have also left children over-consuming calories, saturated fat, and simple sugar, and under-consuming certain important vitamins and minerals.

Food allergies are also increasingly prevalent among children, and soyfoods are a nutritious and safe option that meet the needs of many of these children. Children who do not drink milk due to culture, religion, lactose intolerance, or milk allergy can enjoy fortified soymilk containing calcium and vitamin D. Those with allergies to peanut butter can have soy nut butter instead. Numerous studies have shown that soyfoods lower cholesterol, blood pressure, and markers of type 2 diabetes. Soyfoods can provide calcium, vitamin D, fiber, B vitamins, and heart-healthy, high quality protein to boost children's nutritional status. Studies specifically conducted on children have shown that soy can ease diarrhea, constipation, high cholesterol, and may also prevent the development of breast cancer later in life.

This report summarizes the current dietary issues facing today's children and outlines how soyfoods can be a part of the solution. Child Nutrition Program providers who want to make meals consistent with the *Dietary Guidelines for Americans* can use soy to lower the fat and calorie content of meals. Soyfoods fit into the meat/meat alternate, vegetable, bread/grain, and milk/milk alternate groups in the meal patterns of

USDA reimbursable Child Nutrition meals. Current trends in children's health and diet patterns, research on soy and health, and ways soyfoods can add to the nutritional content of the Child Nutrition Programs will be discussed.

I. Current Trends in Children's Health

Today's children face a different world than when their parents were children as personal, family, and community dynamics have left too many children with excess body weight, poor body composition and at risk of adult diseases. No longer are vitamin and mineral deficiencies the major nutritional problems. Instead, excess energy intake and lower physical activity levels result in more children being overweight, which increases the risk of both childhood and adult diseases. This situation can be reversed with early interventions that teach caregivers, parents, and children healthy food choices, food portion control, daily caloric intake needs, and exercise habits.

The federal Child Nutrition Programs play a unique role in influencing children's health. These programs reach large numbers of children, many from low-income, racial/ethnic minority households that may have special dietary needs due to cultural food practices, religious beliefs, or lactose intolerance. The Child Nutrition Programs should provide food options that can meet the needs of an increasingly diverse student population. Additionally, children with food allergies should have access to healthy, nutritionally equivalent food options. Soyfoods can play an important role in addressing overweight, cultural/religious food preferences, lactose intolerance, and food allergies of children in the Child Nutrition Programs.

By all accounts, eating meals away from home is at an all-time high. Between 1977-78 and 1994-96, calories from food prepared away from home increased from 18% to 32% of total calories. Meals and snacks based on food prepared away from home contained more calories per eating occasion, and "away" food was higher in total fat and saturated fat on a per-calorie basis than at-home food¹. The number of participants in the federally funded Child and Adult Care Food Program (CACFP) was over 100 times higher in 2004 than it was in 1969, serving over 3 million children and adults each day². The National School Lunch Program served over 29 million children, and the School

Breakfast Program served almost 9 million children each school day in 2004. The enrollment in these programs has increased steadily over the years³.

In 2004, eight in ten of the CACFP and School Breakfast Program recipients were eligible for free or reduced price meals and over half of participants in the National School Lunch Program received free or reduced price meals³. These programs are reaching a predominately low-income population, many of whom are racial and ethnic minorities. Rising participation rates in the Child Nutrition Programs highlights the important role of the programs in providing healthy meals and snacks, as well as nutrition education, to many of the most nutritionally vulnerable children.

By many accounts, excess body fat is one of the most pressing health issues facing today's youth. The prevalence of overweight among children and adolescents in the United States has doubled in the past two decades. Currently, 16% of children and adolescents between 9 and 16 years old are overweight according to Centers for Disease Control (CDC) growth charts. That compares with 4% of children in the 1971-74^{4,5} survey. The number of overweight children is on the rise, even among the youngest children in the United States. Over 10% of 2- to 5-year olds are overweight according to the 1999-2002 National Health and Nutrition Examination Survey (NHANES)⁵— compared to 6% in the 1971-1974 survey⁶. The prevalence of overweight among children is consistently higher in girls, as well as Mexican and African American youth^{4,5,6} and low-income populations⁷. Children from low-income households often have fewer safe places for physical activity and lack consistent access to healthful food choices^{8,28}. Table 1 presents prevalence data on overweight among children and adolescents in the United States.

Table 1: Prevalence of Overweight (BMI at the 95th percentile or higher) Among Children and Adolescents in the United States 1999-2002⁵

RACE	Children Ages 6 to 11 (%)		Adolescents Ages 12 to 19 (%)	
	MALE	FEMALE	MALE	FEMALE
Black (non-Hispanic)	17.0	22.8	18.7	23.6
Mexican American	26.5	17.1	24.7	19.9
White (Non-Hispanic)	14.0	13.1	14.6	12.7

The medical community warns that excess weight will have serious adverse effects on the mental and physical health of many children throughout childhood and into adulthood. Overweight children suffer disproportionately from high blood cholesterol, hypertension, hyperinsulinemia, insulin resistance, impaired glucose tolerance, type 2 diabetes mellitus, and mental health issues including depression and low self-esteem. Type 2 diabetes, a disease formerly known as adult-onset diabetes, now accounts for between 8% and 45% of all new cases of diabetes (type 1 and type 2) diagnosed by pediatricians⁹. The probability of childhood obesity persisting into adulthood is estimated to be 20% at 4 years of age, and increases to 80% by adolescence. Many of the aforementioned comorbidities will likely persist into adulthood⁴.

In addition to excess weight, many children also suffer from lactose intolerance and food allergies. Lactose intolerance is prevalent in some population groups as early as two years of age. Studies have shown lactose intolerance in up to 85% of Asian-American, 72% of African-American, 70% of Native American, 56% of Hispanic-American, and 21% of Caucasian-American school-aged youth^{10,11,12,13}. Additionally, 2.5%, 1.3%, and 0.8% of children are allergic to cow's milk, eggs, and peanuts, respectively. Recent studies show that the prevalence of peanut allergy has doubled in American children less than 5 years of age in the past 5 years¹⁴. Soy products, such as soy nuts, soy nut butter, and vitamin A, vitamin D, and calcium fortified soymilk can be healthful alternatives for children with milk, egg, and peanut allergies. The prevalence of soy allergies in the pediatric population is estimated to be less than 1%, and the prevalence of severe anaphylactic reactions to soy is quite low, compared to other food allergens^{15,16}.

Although the development of excess body weight and other health conditions during childhood is complex and includes environmental, psychological, and genetic factors, it is widely believed that a child's diet is at least part of the equation. In the next section of this report, food intake patterns of children will be explored, along with ways that soyfoods can help improve children's nutritional intake.

II. What do Children Eat?

Overall, children are consuming too many total calories, and often a disproportionate amount of total fat (particularly saturated fat) and added sugars. Children are taking in too much high-fat meat, candy, and soft drinks, and too few healthy nutrient-dense foods that can deliver fiber and other important vitamins and minerals. According to data collected by the Continuing Survey of Food Intakes by Individuals (CSFII), less than 40% of children and adolescents in the United States meet the *U.S. Dietary Guidelines* for saturated fat (<10% of calories), fruit (2 to 4 servings per day), and vegetable (3 to 5 servings per day) intake¹⁷. Over 20% of children's caloric intake comes from discretionary fat and over 15% comes from added sugars¹⁸. According to a USDA study, lunches served in both elementary and secondary schools continue to exceed the Dietary Guidelines for both total fat (<30% of calories) and saturated fat (<10% of calories). This study also showed that milk was not being chosen by 16% of secondary school students and 6% of elementary school students¹⁹. Children's intake of calcium, vitamin D, fiber, and zinc^{20,21,22,23,24} is lower than recommended. Children's food choices today are likely to persist and put them at lifelong risk of diet-related diseases.

In the United States, even infants and toddlers show early signs of dietary excesses and poor food choices. A recent study showed that almost one in ten children 9 to 11 months old ate French fries at least once a day. By 19 to 24 months of age, French fries were the most frequently consumed vegetable. High-fat hot dogs, sausages, and cold cuts were also daily staples for one in three very young children 19 to 24 months old. Sweetened beverages, desserts, and candy were consumed by nine out of ten 19 to 24 month old children in the study, while only seven out of ten consumed at least one serving of fruit and less than two in ten had a green or yellow vegetable²⁵. Food preferences developed in the infant and toddler years tend to continue throughout childhood, adolescence, and into adulthood. Because the first years of life are when many dietary habits and food preferences are formed, children should limit energy-dense, nutrient-poor foods and receive healthier options.

Healthy soy choices

Excessive intake of saturated fat is known to be a risk factor for developing heart disease; however, soyfoods, low in saturated fat and cholesterol-free, can benefit heart health²⁶. Adding soy meat-alternatives, soy/meat blends, soybeans, soy nuts, soy pastas, soy breads, fortified soymilk, tofu, and soybean oil to menus can be a positive step for kids' heart health. Many fortified soyfoods are also good sources of calcium, vitamin D, fiber, and iron, which are high-priority nutrients for growing children (**See Table 2**). Introducing soy early in life may help children develop healthy eating patterns that last a lifetime.

For adolescents and young adults ages 11 to 20 in Southern California, across all socioeconomic, racial, and ethnic groups, the average daily food intakes were below the minimum recommended number of servings for all major food groups in the Food Guide Pyramid, and most of these older children consumed excessive amounts of added sugar, saturated fat, and calories²⁷. Families with parents with higher educational attainment and income are more likely to eat enough dairy products, fruits and vegetables²⁷, while lower-income families, many of whom are racial and ethnic minorities, tend to eat more energy-dense foods composed of refined grains, added sugars, or fats mainly because these foods are cheaper than healthier choices such as lean meats, fish, fresh fruits and vegetables²⁸. Because the Child Nutrition Programs serve a predominantly low-income segment of the U.S. population, particular attention should be paid to foods offered through the program to help prevent excess weight from developing. Adding soy to Child Nutrition Program menus may improve the diets of many of the children who are at high risk for consuming a nutrient-poor diet.

Many successful school-based nutrition interventions involve nutrition education as well as improvements to school meals and have been able to positively impact children's health and well-being. Providing nutrition education along with reducing total fat, calories, saturated fat, and cholesterol in children's diets tends to be highly effective and safe in lowering serum LDL cholesterol and inducing positive dietary habits in children and adolescents²⁹. Current research suggests that incorporating soy into meals may help decrease fat, saturated fat, and calories, and increase fiber, while still providing children with key vitamins and minerals.

Specifically, soy can improve children's nutritional intake by:

- Replacing some high-calorie, high-saturated fat meats with soy meat-alternatives and soy/meat blends to reduce caloric, saturated fat, and cholesterol content of meals.
- Increasing fiber intake by adding soy pasta, soy nuts, cooked soybeans, or steamed edamame to meals.
- Adding nutrient-dense soyfoods like frozen soy, soy smoothies, honey-coated soy nuts and soy chips to children's diets to replace excessive amounts of high-calorie, low nutrient desserts, candy, sweetened beverages, and salty snacks currently present in the diets of many young children.
- Adding fortified soymilk containing calcium, vitamin A, vitamin D, and high-quality protein to the diets of children who do not drink cow's milk.
- Using soyfoods such as tofu, tempeh, miso, soymilk, and edamame as a teaching tool to introduce children to different cultural eating and lifestyle practices.

Table 2 shows the nutritional profile of many soyfoods. Generally, soyfoods are good sources of high-quality protein, potassium, calcium, folate, and dietary fiber while containing very little saturated fat and no cholesterol.

Table 2: Nutritional profile of soyfoods

Food item	Svg. Size	Kcal	Pro (g)	Fiber (g)	Fat (g)	Sat fat (g)	Chol (mg)	E (AE)	A (RE)	B6 (mg)	Folate (mcg)	B12 (mcg)	C (mg)	Ca (mg)	Mag (mg)	Fe (mg)	Zn (mg)
Soy burger	1 patty (70 g)	125	13	3	4	0.5	0	1.2	0	0.8	54.6	1.7	0	20	12.6	1.5	1.3
Hamburger patty	1 patty (83 g)	204	20	0	13	5	71	0.4	0	0.3	7.5	2.2	0	21	17.4	2.1	5
Soy milk (fortified)	1 cup	110	7	1	4	0.5	0	1.2	30	0	60	0.9	0	300	40	1.1	0.9
Soy milk unsweetened (fortified)	1 cup	80	7	0.5	4	0.5	0	1.2	30	0	60	0.6	0	300	40	1.1	0.9
Milk, 3.5 to 3.8% fat	1 cup	150	8.0	0.0	8.1	5.1	33	0.2	76	0.1	12	0.9	2	291	33	0.1	0.9
Soy pasta	1 cup	240	15.6	2.5	1.24	0	0	--	--	--	--	--	--	--	--	--	--
Pasta	1 cup	197	6.7	2.4	1	0.1	0	0.1	0	0	108	0	0	10	25	2	0.7
Soy deli slices	62 g	81	15	--	0.9	0.4	0	--	--	--	--	3.24	--	--	24	4.32	4.5
Turkey bologna	62 g	127	7	0	10	2.6	46	0.3	5.5	0.1	5.5	0.1	8	74	10	1.8	13
Mature soybeans	½ cup	149	14	5	7.5	0	0	0	0	0	47	0	1.5	88	74	4.5	1
Fresh soybeans	½ cup	125	11	4	5	0	0	--	7	0	100	0	15	130	50	2.5	1
Soy nuts	½ cup	288	34	7	19	3	0	0	0	0	176	0	4	120	196	3	2
Soy nut butter	2 Tbsp	170	8	1	11	1.5	0	--	0	--	--	--	0	50	--	0	--

III. Research on Soy in Children's Diets

For thousands of years, soy has been a staple of the Asian diet, but over recent decades, more and more health conscious Americans are eating soy. Why soy? Soy has been found to have numerous health benefits including **decreasing the risk of developing heart disease, strengthening bones, decreasing risk of certain cancers, and even helping with appetite and weight control**. Studies of soy in children and adolescents have shown that soy **eases constipation³⁰, combats diarrhea³¹, lowers high cholesterol^{32,33}**, and may even **decrease risk of breast cancer later in life³⁴**.

A growing number of children have allergies, food intolerances, religious and cultural needs that require special dietary considerations. Most students who are allergic to peanut butter can enjoy soy nut butter. Most students with milk protein allergy, lactose intolerance, or religious/cultural food practices that prohibit milk consumption can get calcium, vitamin D, vitamin A, and high-quality protein from fortified soymilk.

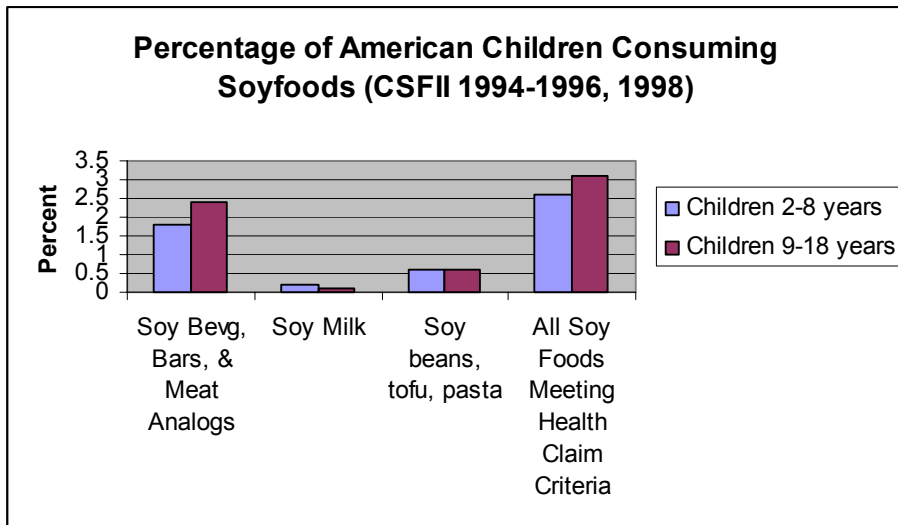
Consumption of soy during infancy and childhood

In traditional Chinese diets, the four most important soyfoods were miso, tempeh, tofu, and soy sauce. Soymilk appeared as a beverage about 500 years ago in China. Recent innovations in soyfood processing have created new, flavorful products tailored for the modern American diet. Infants, children, and adults consume newer soyfoods such as meat alternatives, cultured soy, soy cheese, frozen soy, soy smoothies, soy chips, and soy cereals. Consuming soyfoods brings numerous health benefits to the whole family.

Soy products are consumed by 90% of healthy Asian children, with 95% of these children consuming soyfoods before 18 months of age. Asian mothers prefer to use tofu during weaning because of its availability, soft consistency, high palatability, and high nutritional value. By the age of 10, over 50% of Asian children in Singapore consume soymilk as their primary beverage³⁵. Among Taiwanese children, the most commonly consumed soyfoods are soymilk (3 cups per week), soft tofu (1 cup per week) and firm tofu (1/2 cup per week). Researchers note that "no [adverse] effects have been reported in children, either anecdotally or in the scientific literature"³⁶.

Almost ten year old USDA data (CSFII 1994-98) show relatively low soyfood intake in American children, but more recent studies found that 4% of American children regularly consume soymilk²⁵. See **Figure 1** for percentage of children ages 2-18 years consuming soyfoods between 1994 and 1998.

FIGURE 1. Percentage of American Children Consuming Soyfoods³⁷



Acceptance of soy by children and preschoolers

Will children accept meals with soy? Childcare providers and schools may ask whether soy will be accepted by the children they serve. Children 3 to 6 years old who were participating in a Head Start Program serving soy consumed as much of soy-enhanced lunch items as non-soy lunch items. Although the energy content of traditional compared with soy-enhanced lunches was similar, the soy-enhanced lunches delivered significantly more protein and iron while providing less total and saturated fat. “Soy-enhanced foods can add variety to children’s diets without sacrificing nutrient value, taste, or energy,” according to University of Illinois researchers³⁸.

Health effects of soy on infants, children, and adolescents

Soy and infant health

Soy-based infant formulas (SBIF) have a lengthy history of safe use in the United States and around the world. SBIFs were used at the beginning of the 20th century for infants with eczema and later became a commercial product available for any infant

who had allergy or intolerance to cow's milk formula or breastmilk. Approximately 25% of infants in the U.S. receive soy-based infant formulas due to an infant's milk allergy, lactose intolerance, or galactosemia. These formulas provide infants of vegans a substitute for human milk³⁹. Both the American Academy of Pediatrics and the U.S. Food and Drug Administration (FDA) support the use of soy-based infant formulas as safe and effective alternatives to provide appropriate nutrition for normal growth and development in term infants whose nutritional needs are not being met from human milk or cow's milk-based infant formulas³⁹. From a clinical standpoint, neither pediatricians nor pediatric endocrinologists have reported adverse estrogenic effects on sexual development or adverse effects on growth, maturation, thyroid function, or bone mineralization in infants fed infant formulas made from soy protein isolates⁴⁰.

Soy-based infant formula has shown positive results in treating diarrhea in a well-designed clinical trial of 73 infants. The total duration of diarrhea was significantly longer in those receiving cow's milk than in those receiving soy-based formula⁴¹. Similarly, in a study of Nigerian children with diarrhea and malnutrition, commercially available soymilk, homemade soymilk, and soybeans were shown to decrease the severity and duration of diarrhea while stimulating weight gain⁴². Bone mineralization and vitamin D metabolism in infants fed soy formula is comparable with infants fed cow's milk formula and breast milk⁴³.

A retrospective analysis of U.S. adults who had been fed soy infant formula as babies have not shown differences in reproductive, growth, endocrinological, or developmental outcomes⁴⁴. When children ages 7 to 96 months who were consuming soy infant formula were compared to infants consuming cow's milk formula, markers of bone and thyroid health as well as pubertal development were the same⁴⁵. The role of soy in growth, cognitive function, body composition, bone density, and metabolism of infants fed soy formula should be answered by a prospective study at the USDA Arkansas Children's Nutrition Research Center⁴⁶.

Soyfoods during childhood and adolescence

In addition to being a tasty alternative in children's meals, soy may also help prevent the development of certain diseases when consumed in childhood and

adolescence. A case-control study conducted on Asian women in Shanghai, China found that high childhood and adolescent soyfood intakes were inversely associated with risk of breast cancer, after adjusting for other factors⁴⁷. Childhood and adolescent soyfood consumption is a possible explanation for the disparity in breast cancer incidence between Asian and Caucasian women⁴⁷.

Early exposure to soymilk also protects against heart disease. In an 8-week study of 23 children about 10 years of age with familial or polygenic hypercholesterolemia, the cholesterol-lowering effect of a soy protein diet was compared to a diet with a standard low fat, low cholesterol diet. The study found that a diet substituting 15 to 20 grams of soy protein for animal protein has a more beneficial short-term effect on total cholesterol and LDL cholesterol levels in children with hypercholesterolemia than a standard low fat diet.⁴⁸

In a similar study of 10 children ages 6 to 12 years, a soy protein beverage (20 grams of soy protein) compared to cow's milk (19 grams of milk protein) induced significant reductions in plasma triglycerides and very-low-density lipoprotein (VLDL) cholesterol, as well as a significant increase in high-density-lipoprotein (HDL) cholesterol⁴⁹. Consumption of soy protein beverages may be beneficial in preventing heart disease in children with familial hypercholesterolemia. The cholesterol-lowering effect of soy is especially encouraging since hypercholesterolemia is rising among American children and adolescents.

Infants and children with chronic constipation may benefit from adding soy infant formula or fortified soymilk to their diets. In a study of 65 children aged 11 to 72 months with severe chronic constipation, 7 in 10 had a response to adding soy infant formula or soymilk to their diet (i.e., had 8 or more bowel movements during a two-week treatment period). None of the children who received cow's milk or cow's milk formula had a response during the study. On the basis of histological findings, the researchers conclude that constipation was a clinical symptom of cow's milk allergy³⁰. These results point to soymilk as a promising treatment for children with constipation which is caused by cow's milk allergy.

Safety of soy for children

Many traditional soyfoods—like tofu, miso, and tempeh—have been consumed for centuries in Asian cultures. Both the USDA *Dietary Guidelines for Americans* and the *Food Guide Pyramid for Young Children* list soyfoods like fortified soymilk, tofu, and soy burgers as healthy options. Numerous studies are underway at the National Institutes of Health and the USDA on the health benefits of soy, including the USDA study of soy and infant development. If there were any evidence to suggest that soy is dangerous, these studies would surely not be conducted. There is no published human research to support the claim that soy has adverse health effects on Asian children or other children who consume soy. As reviewed throughout Section III of this report, soy has shown a positive effect on certain cancers, diarrhea, constipation, and elevated cholesterol levels in research studies that included children.

IV. Role of Soy in Federal Child Nutrition Programs

Recognizing the growing number of children from diverse backgrounds served by the Child Nutrition Programs, the U.S. Department of Agriculture has made, and is making, changes that will accommodate the cultural, religious and health needs of the entire population eligible for these programs. In particular, USDA has lifted the 30% limitation on soy protein in meat/meat alternates and loosened the restrictions for reimbursing nutritionally equivalent non-dairy alternatives in school meals. In 2000, USDA changed its regulations to allow soy protein to fulfill 100 percent of the “meat/meat alternate” component in the Child Nutrition Programs. In 2004, Congress passed a law to permit child nutrition institutions to offer a non-dairy beverage that is nutritionally equivalent in calcium, protein, vitamin A, and vitamin D to cow’s milk. Calcium, vitamin A, and vitamin D fortified soymilk may be served as part of a reimbursable meal for students with a parent’s note that they cannot consume cow’s milk because of a medical or other special dietary need. USDA should finalize regulations on this provision by late fall of 2005. The Institute of Medicine has issued a report recommending that USDA allow the inclusion of soymilk and calcium-set tofu in the food packages for pregnant and lactating women participating in the Supplementary Food Program for Women, Infants, and Children (WIC)⁵⁰. The wide variety of soyfoods offers schools, child care providers and summer food service operators a tremendous opportunity to meet the nutritional requirements of students with diverse dietary needs.

Soy in USDA meal patterns

Soy products fit into several groups of the USDA meal patterns for reimbursable meals, including the meat/meat alternate, the vegetable or fruit, and the milk/non-dairy alternate groups. **Fresh soybeans, soybean sprouts, canned soybeans and dried soybeans** are credited as either **vegetables or meat/meat alternates**. In addition, either soy/meat blends or 100% soy meat alternatives made with **soy flours, soy protein concentrate, soy protein isolate, and textured soy protein** are credited as **meat/meat alternates**. USDA defines these soy ingredients as **Alternate Protein Products (APP) and credits them on an ounce-for-ounce basis** in the meat/meat alternate group. **Soy pasta and other baked soy products** are creditable in either the

bread/grain group or the **meat/meat alternate group**, depending on the how the soyfood is used in the menu item. **Soy milk fortified with vitamin A, vitamin D, and calcium** may be credited in the **milk group** with a parent request for children who cannot drink cow's milk or who have special dietary needs (pending final rules). At this time (summer 2005) tofu, tempeh, soy-based cheese alternatives, and cultured soy are not credited by USDA for use in the Child Nutrition programs.

Table 3: Crediting Soy in the Child Nutrition Programs

Menu Category	Soy Products
Meat/Meat Alternate Group	Soybeans (dry or canned) Soy nuts Soy nut butter Alternative Protein Products <ul style="list-style-type: none"> ▪ Soy protein isolate ▪ Soy protein concentrate ▪ Soy flour ▪ Textured soy protein Baked soy products*
Bread/Grain Group	Soy pasta with adequate grain Baked soy products (breads) with adequate grain*
Vegetable Group	Fresh soybeans (edamame) Soybeans (dry or canned)
Milk Group**	Soy milk fortified with vitamin A, vitamin D, and calcium
Fats/Oils***	Soybean oil

* Grain products made with soy flour may be credited to meat alternate group if the grain product is part of an entrée. To be credited as a grain product, the specified amount of grain must be present as well as the soy ingredient.

** Pending final USDA regulations

*** Fats/oils are not credited toward the meal patterns in the USDA Child Nutrition Programs, however soybean oil can enhance flavor and provide important nutrients in meals.

USDA permits soy ingredients (Alternate Protein Products, or APP) to substitute for 100 percent of the meat requirement without any special fortification⁵¹ because of their lean composition and high content of healthy nutrients like high quality protein, fiber, and iron. USDA's Food and Nutrition Service stated that lifting the restriction and allowing 100% APP products would enhance flexibility for menu planners and make it easier to make meals that meet the *Dietary Guidelines for Americans*. The USDA's *2001 Food Buying Guide for Child Nutrition Programs*, but not the *1994 Food Buying Guide*, provides useful information on how to purchase and use soy nuts, soy nut butter,

and fresh, canned dry, and cooked dry soybeans. The new category of Alternate Protein Products is mentioned in the meal pattern under meat/meat alternates, but food service personnel will need to request Child Nutrition labeled product specifications from the food manufacturers in order to credit food items made with APP. Chicken nuggets, hamburgers, chili mixes, hot dogs and other kid-friendly foods are available as soy/meat blends or 100% soy meat-alternatives.

Increasing the use of soy in the Child Nutrition Programs is a cost-effective way to decrease fat, saturated fat, cholesterol and calories in meals while maintaining nutritional quality. Soy protein provides a heart health benefit to a high-nutritional-risk, low-income population. The companion manual, *Making Winning Meals with Soy*, for school and childcare foodservice provides further information on incorporating soy into meals for kids.

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