

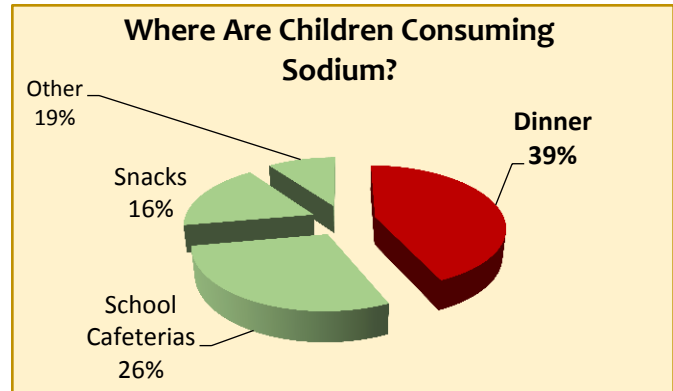
# Sodium Targets in the National School Lunch Program

The School Nutrition Association (SNA) advocates that Target 1 sodium level reductions are maintained and that further implementation of targets is suspended. (See pg 4 for targets)

Schools have made significant sodium reductions to meet Target 1 recommendations, effective July 2014.

A report from the Centers for Disease Control and Prevention (CDC) shows that among children who

consume school meals, only 26% of daily sodium intake comes from school cafeteria foods, while 39% of sodium is consumed at dinner and 16% from snacks (Cogswell, 2014).



The Institute of Medicine (IOM) (2010) stated that, **“reducing the sodium content of school meals as specified (in Targets 2 and 3) and in a way that is well accepted by students will present major challenges and may not be possible.”**

The ubiquity of sodium in the diet of children in the United States (where 65% percent of sodium intake comes from store foods and 13% from fast food/pizza restaurants) and the preference for salty foods create substantial challenges for schools to provide acceptable meals for students (Cogswell, 2014) and meet upcoming Targets 2 and 3 for sodium.

The scientific evidence to support further reductions in sodium for school meals is inconclusive. Increased blood pressure in children is most strongly associated with overweight, not with sodium intake. SNA strongly supports measures that help children maintain a healthy weight, including calorie limits and offering a greater quantity and variety of fruits, vegetables, and whole grains. This approach is also recommended by the American Academy of Pediatrics (2015). “The American Academy of Pediatrics (AAP) urges schools and families to take a broader approach to nutrition, considering children's whole diet pattern – rather than the amount of sugar, fat or specific nutrients in individual foods.” The AAP recommends using small amounts of salt, sugar, fats and oils to enhance enjoyment and consumption of healthy food.

Further, a growing body of research suggests that the national recommended levels of sodium are too low.

- O’Donnell and colleagues found in a study of 101,945 persons in 17 countries that as estimated sodium intake between 3,000 mg/day and 6,000 mg/day was associated with a lower risk of death and cardiovascular events than higher or lower than those amounts. (NEJM, 2014)
- Dr. Robert Heaney points out in ‘Making Sense of the Science of Sodium, published in Nutrition Today, that there is a risk in consuming too little sodium.
- The IOM published a report in 2013 which states that there was no evidence of benefit for reduction of sodium intake below 2,300 mg/day. The IOM committee concludes that more randomized-controlled trials are needed to determine the effect of sodium on health outcomes.

SNA would agree that there is more research needed to support sodium recommendations. These findings, and other emerging evidence questioning long-held positions on lowering sodium may not hold universal

acceptance, they certainly bring into question the benefits of reducing sodium in school meals to the Target 2 and final Target levels.

## Children, Sodium, and Cardiovascular Health



### What is blood pressure and how is it measured?

Blood pressure is the amount of pressure that blood puts on the blood vessel walls when the heart pumps. Blood pressure is recorded as two numbers; a higher number (systolic) and a lower number (diastolic). A normal blood pressure for an adult would be recorded: 120/80 mm Hg (or millimeters of mercury).

As children grow, their blood pressure increases. A normal blood pressure for an infant would be 70-90/50-65 mm Hg, and it increases to adult values in a teenager. Charts are used to determine if a child's blood pressure is in a normal range.

Research on the benefits of sodium reduction for children and the level at which sodium reduction is beneficial for children is inconclusive. A recent study in *Pediatrics* (Yang, 2012) indicated a small reduction in blood pressure, showing that each 1,000 mg per day of sodium intake was associated with ~1.0 mm Hg increase in systolic blood pressure. However, other studies show no change in blood pressure from an increase in sodium intake. A study by Howe (1991) showed no significant difference in blood pressure when

lowering sodium from 3,450 mg/day to less than 1,725 mg/day. Similarly, in a study by Cooper (1984), a reduction of 2,530 mg to 1,035 mg of sodium/day did not appear to have an effect on blood pressure in adolescents.

*See Table 1 for a summary of literature regarding the effects of sodium on blood pressure in children.*

Looking at this in the context of the SY 2022-2023 sodium targets for school meals, with no replacements from other sources, sodium intake among U.S. school-aged children would be reduced by about 600mg on days children consume school lunch (compared to SY2014-2015). **Based on the Yang (2014) study, this would result in a very small decrease in blood pressure, only about 0.6 mm Hg (systolic pressure).**

### Other Considerations

The possible small reduction in blood pressure as a result of lowering sodium intake should be viewed in a larger nutritional context. **Sodium is not the isolated cause of developing hypertension in children. Moderate weight loss offers far more significant reductions in blood pressure for children (8-12 mm Hg) (National Institutes of Health, 2005) than sodium reduction.**

Some researchers also believe that large reductions in sodium may lead to increased consumption of refined carbohydrates, which can cause increased weight and other cardiovascular related risks (DiNicolantonio, 2014).

SNA supports federal nutrition standards that help children maintain a healthy weight, including calorie limits and mandates to offer a greater quantity and variety of fruits and vegetables.

Consumption of fruits and vegetables, whole grains, and low fat dairy also have a positive effect on blood pressure. Potassium, folic acid, and fiber that are found in these foods have been associated with lower blood pressure in children and adolescents (National Institutes of Health, 2005). Buendia et al found in a study of adolescent girls that consumption of 3,500 mg/day or more had no adverse effect on blood pressure and that

the beneficial effects of potassium-rich foods may help suppress the increase in blood pressure. (JAMA Peds, 2015)

When comparing overall nutritional quality, school lunches have generally been shown to be more nutritious than packed lunches or lunches purchased at fast food restaurants (Farris, 2014 & O’Donnell, 2008). Yet, despite the health benefits of school lunches, the US Government Accountability Office (GAO) (2014) reported that there was a decline in participation of 1.2 million students from 2010-2011 through school year 2012-2013 (since new dietary regulations have been implemented).

One reason for this decrease in lunch participation was the acceptability and palatability of food. Sodium content reductions in some foods have been shown to result in significant loss of palatability (National Institutes of Health, 2010). The GAO further warned that forthcoming limits on sodium would remain problematic, with cost and product availability making sodium targets difficult for many schools to implement. The American Academy of Pediatrics (2014) is advocating that schools take a “whole diet approach” to meals instead of focusing on the amount of certain nutrients.

<b>Federal Sodium Reduction Mandates</b>			
Grades	Target 1 (July1, 2014)	Target 2 (July1, 2017)	Final Target (July1, 2022)
<b>Reimbursable School Breakfasts</b>			
K-5:	≤ 540	≤ 485	≤ 430
6-8:	≤ 600	≤ 535	≤ 470
9-12:	≤ 640	≤ 570	≤ 500
<b>Reimbursable School Lunches</b>			
K-5:	≤ 1,230	≤ 935	≤ 640
6-8:	≤ 1,360	≤ 1,035	≤ 710
9-12:	≤ 1,420	≤ 1,080	≤ 740
<b>Competitive Foods (a la carte, vending)</b>			
Entrées: ≤ 480 mg Snacks/Sides: ≤ 230 mg (≤ 200 mg by July, 2016)			

<b>National School Lunch Program USDA Participation Data</b>				
Average Participation				
Fiscal Year	Free	Reduced Price	Full Price	Total
Millions				
2012	18.7	2.7	10.2	31.7
2013	18.9	2.6	9.2	30.7
2014	19.1	2.5	8.7	30.3
Change	+0.4	-0.2	-1.5	-1.4

Table 1: A summary of studies on the association between sodium intake and blood pressure in children.\*

Study Name	Amount of Sodium (calculated into milligrams for convenience in comparison) Recommended sodium intake = 2,300 mg/day	Conclusions
Changing sodium intake in children (Gillum, 1981)	3,059 mg of sodium/day in the control group and 2,001 mg of sodium/day in the low sodium group	No statistical change in blood pressure between the two groups.
A randomized trial on the effect of decreased dietary sodium intake on blood pressure in adolescents (Cooper, 1984)	2,530 mg of sodium/day in the diet decreased to 1,035 mg sodium/day	No overall short-term effect on blood pressure in adolescents.
Modest sodium supplementation and blood pressure change in boarding school girls (Tuthill, 1985)	2,000 mg of sodium given as a supplement to two groups (one in the morning and one in the evening) plus a control group given placebo	There was no significant relationship between blood pressure and level of sodium supplementation.
Effects on blood pressure of a decrease in sodium use in institutional food preparation: the Exeter-Andover Project (Ellison, 1989)	Sodium intake of was reduced by 15-20% through changes in food purchasing and in preparation practices in the schools' kitchens; no other changes	The study showed a reduction in blood pressure, -1.7 mmHg for systolic and -1.5 mmHg for diastolic pressure, based on the intervention.
Lack of effect of short-term changes in sodium intake on blood pressure in adolescent schoolchildren (Howe, 1991)	Diet of more than 3,450 mg of sodium/day compared to a goal of less than 1,725 mg of sodium/day	There was a small decrease in blood pressure, but it was not statically significant.

Study Name	Amount of Sodium (calculated into milligrams for convenience in comparison) Recommended sodium intake = 2,300 mg/day	Conclusions
Effect of low sodium diet or potassium supplementation on adolescent blood pressure (Sinaiko, 1993)	Low sodium group compared to placebo group (potassium supplementation was also studied). Diet goals for low sodium groups was 1,610 mg of sodium/day, which was not met	The data from this study show that dietary changes (including reducing sodium) within the first twenty years of life possibly reduce the rate that blood pressure increases in girls (not boys).
Sodium retention in black and white female adolescents in response to salt intake (Palacio, 2004)	A diet of 4,000 mg of sodium/day for the control group and a diet of 1,300 mg of sodium/day in low sodium group compared to pre-intervention blood pressure	Blood pressure did not increase with an increase in salt consumption.
Importance of salt in determining blood pressure in children: Meta-analysis of controlled trials (He, 2006)	Analysis of several controlled studies	This study demonstrated that a modest reduction in salt intake decreased blood pressure.
Sodium intake and blood pressure among US children and adolescents (Yang, 2012)	Results from the NHANES (National Health and Nutrition Examination Survey) were used to determine whether there was a correlation in diets ranging from 1,334 to 8,177 mg of sodium/day and blood pressure.	This study indicated that each 1,000 mg of sodium/day intake was associated with ~1.0 mm Hg increase in systolic blood pressure.
Childhood blood pressure trends and risk factors for high blood pressure: The NHANES Experience 1988-2008 (Rosner, 2013)	Compared sodium intake and blood pressure for children in the NHANES (Nation Health and Nutrition Examination Survey) 1988-2008	An increase in mean systolic blood pressure (but not diastolic blood pressure) was associated with increased sodium intake when comparing <2,300 mg of sodium/2,000kcal to >3,754 mg of sodium/kcal.

Study Name	Amount of Sodium (calculated into milligrams for convenience in comparison) Recommended sodium intake = 2,300 mg/day	Conclusions
Longitudinal Effects of Dietary Sodium and Potassium on Blood Pressure in Adolescent Girls (Buendia, 2015)	Compared sodium and potassium intake with blood pressure and health effects. Sodium intake was classified as < 2500; 2500 - <3,000; 3000 - <4000; and 4000 or more.	In this study of adolescent girls, consumption of 3500 mg/d of sodium or more had no adverse effect on blood pressure. The beneficial effects of potassium suggest that consuming more potassium-rich foods during childhood may help suppress adolescent increase in blood pressure.

\* This table is meant to be representative of the scientific literature regarding children and sodium intake but is by no means exhaustive. This table does not include studies where the subjects were infants.

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