



# Pediatric Academic Societies Meeting

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## **Teens and Adolescents Who Consume Too Much Salt Show Unhealthy Changes to Blood Vessels**

*Research at the 2017 Pediatric Academic Societies Meeting detects arterial stiffness, or hardening of the arteries, that may put youth on the path to cardiovascular disease.*

SAN FRANCISCO – Findings of a new study being presented at the 2017 Pediatric Academic Societies Meeting in San Francisco suggest adolescents who consume too much salt have measurable changes in their blood vessels associated with early signs of cardiovascular disease in adults.

Arterial stiffness, sometimes called hardening of the arteries, is a known risk factor for heart attack and stroke in adults. Monitors placed on the skin near major arteries in the arm, neck and groin can detect this condition, which indicates increased risk of heart attack and stroke.

Recent studies have found increased arterial stiffness in youth with risk factors such as obesity, diabetes, hypertension and high cholesterol. Researchers presenting the abstract, “Effect of Dietary Sodium Consumption on Arterial Stiffness in Youth,” on Monday, May 8, in the Moscone West Convention Center examined whether too much salt in the diet of teens and adolescents similarly affects their artery walls.

The National Institutes of Health-funded study involved 775 participants recruited from an Ohio children’s hospital who were measured for the elasticity or distensibility of their brachial artery (BrachD), located in the upper arm. Pulse wave velocity (PWV) was also measured for differences in the speed that blood traveled between their carotid artery in the neck and femoral artery in the groin. The amount of sodium they consumed was measured with self-reported, 3-day diet records.

Elaine M. Urbina, MD, MS, Director of Preventive Cardiology at Cincinnati Children's Hospital Medical Center and lead author of the study, said the results showed that higher average daily sodium intake was associated with lower BrachD and higher PWV after adjusting for age, race, sex, body-mass index and other blood electrolyte levels that could affect readings.

"Together, these two readings indicated higher levels of stiffness in both peripheral arteries in the extremities, as well as in central arteries, tied to higher sodium consumption," Urbina said.

"It's clear that adolescents and young adults have higher-than-recommended amounts of salt in their diet. Our study suggests this may translate into changes in the body that put them at higher risk for future heart attack and stroke."

Dr. Urbina will present the abstract, "Effect of Dietary Sodium Consumption on Arterial Stiffness in Youth," at 8:30 a.m.

Reporters interested in an interview with Dr. Urbina contact her assistant, Melinda Andrews, at 513-636-8265.

*Please note: only the abstract is being presented at the meeting. In some cases, the researcher may have more data available to share with media, or may be preparing a longer article for submission to a journal. Contact the researcher for more information.*

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*The Pediatric Academic Societies (PAS) Meeting brings together thousands of individuals united by a common mission: to improve child health and wellbeing worldwide. This international gathering includes pediatric researchers, leaders in academic pediatrics, experts in child health, and practitioners. The PAS Meeting is produced through a partnership of four organizations leading the advancement of pediatric research and child advocacy: Academic Pediatric Association, American Academy of Pediatrics, American Pediatric Society, and Society for Pediatric Research. For more information, visit the PAS Meeting online at [www.pas-meeting.org](http://www.pas-meeting.org), follow us on Twitter @PASMeeting and #pasm17, or like us on Facebook.*

## **ABSTRACT**

**TITLE:** Effect of Dietary Sodium Consumption on Arterial Stiffness in Youth

**Background:** Measures of arterial stiffness predict hard CV events in adults. Recent studies demonstrate increased arterial stiffness in youth with risk factors including obesity, diabetes, hypertension and dyslipidemia. Whether adverse dietary patterns found in these high risk youth mediate the development of increased arterial stiffness has not been thoroughly investigated.

**Objective:** Our objective was to examine the effect of dietary sodium consumption on arterial stiffness measures in adolescents and young adults in a study evaluating the CV effects of T2DM.

**Design/Methods:** The mean of 3 measures of brachial artery distensibility (BrachD), and carotid-femoral PWV (PWV) were obtained in 775 subjects. Anthropometrics, resting BP and laboratory measures were also obtained. Dietary sodium was measured with 3-day diet records evaluate with Nutrition Data System for Research software. General linear models were constructed to determine if dietary sodium consumption (Na) was a predictor of arterial stiffness after adjusting for demographics, total energy consumption and dietary calcium (Ca), magnesium (Mg) and potassium (K).

**Results:** Mean (SD) intake/day was calories= 2075 (797); Ca= 848 (449) mg, K= 2057 (910) mg; Mg= 216 (95); Na 2784 (1573). Higher Na intake was associated with lower BrachD and higher PWV indicating higher peripheral and central arterial stiffness, respectively. Na remained a significant determinant of both measures of arterial stiffness after adjustment for age, race, sex, BMI z-score, Ca, K and Mg. Na only remained significant in the PWV model after adjusting for lipids. Both models lost significance after further adjustments for BP or presence of diabetes. Final models (all  $p < 0.0001$ ) with Na: BrachD =  $6.71 - 0.023 \cdot \text{age} + 0.40 \cdot \text{sex} + 0.0022 \cdot \text{race} - 0.068 \cdot \text{BMIz} + 0.00025 \cdot \text{calories} - 0.00017 \cdot \text{Ca} + 0.00071 \cdot \text{Mg} - 0.000098 \cdot \text{K} - 0.00011 \cdot \text{Na}$  ( $R^2 = 0.42$ ); PWV =  $2.04 + 0.15 \cdot \text{age} + 0.20 \cdot \text{sex} + 0.19 \cdot \text{race} + 0.39 \cdot \text{BMIz} - 0.0000019 \cdot \text{calories} + 0.0000037 \cdot \text{Ca} - 0.0019 \cdot \text{Mg} + 0.000082 \cdot \text{K} + 0.000091 \cdot \text{Na}$  ( $R^2 = 0.44$ ).

**Conclusion(s):** We conclude that adolescents have higher than recommended dietary sodium intake. Dietary sodium has an effect on arterial stiffness in young persons that is either overshadowed by other CV risk factors or is affected by limitations in the accuracy of self-reported dietary intake. More precise methods to measure the effect of dietary intake on development of atherosclerosis are needed to prevent future heart attack and stroke.