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Differences in Hypertension and Obesity Levels between High School Students in Philadelphia Urban and Suburban Areas

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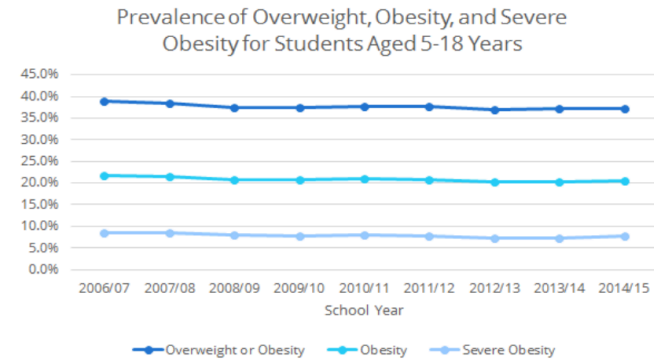
Prevalence of Hypertension and Obesity in High School Students in Philadelphia Urban and Suburban Areas

Joseph Gonnella, Jeremy Close MD*

Introduction and Objective

- Problem
 - Limited data exists regarding hypertension and obesity levels of Philadelphia area high school students in recent years
 - Continued childhood/adolescent obesity¹
 - Connect with study's statistics
- Rationale
 - There is a link between childhood/adolescent obesity and hypertension and diabetes and cardiovascular diseases in the future^{2,3}
 - Determine the demographic that is most affected

Childhood Obesity has Slightly Declined since 2006 but Continues to Affect 1 in 5 Children



<https://www.phila.gov/media/20181106124818/chart-v2e8.pdf>

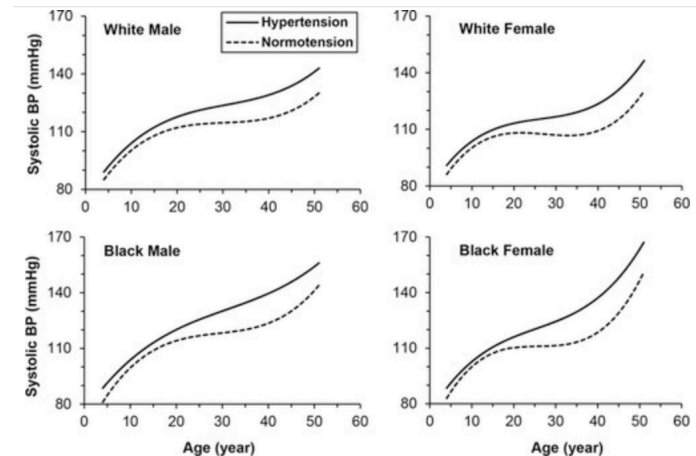


Figure 2. Growth curves of systolic blood pressure (SBP) by race-sex hypertension groups.

Shen, Wei, et al.³

Inquiry Question

- What is the prevalence of obesity and hypertension in high school students in Philadelphia urban and suburban areas?
- Main Goals
 - Gather data on obesity and hypertension in this population
 - Determine whether obesity and hypertension differs in race, sex
 - Compare prevalence between urban and suburban settings
 - Find areas/high schools of higher risk and target them specifically to implement screening tools and intervention strategies
- Hypothesis
 - The suburban population will present with lower obesity and hypertension levels

Methods

- Use data collected from pre-participation physical evaluations (PPEs) performed by the Athlete Health Organization and Simon's Heart Heartbytes database^{4,5}
 - Includes biometric information, a history, and a physical examination
 - Age, sex, race/ethnicity, height, weight, systolic and diastolic blood pressure
 - The data was collected and analyzed for BMI and its classification and blood pressure classification
- t tests were performed to determine significance

Body mass index (BMI) is a measure used to determine childhood overweight and obesity. Overweight is defined as a BMI at or above the 85th percentile and below the 95th percentile for children and teens of the same age and sex. Obesity is defined as a BMI at or above the 95th percentile for children and teens of the same age and sex.

<https://www.cdc.gov/obesity/childhood/defining.html>

For children aged ≥ 13 y

Normal BP: $< 120 / < 80$ mm Hg

Elevated BP: $120 / < 80$ to $129 / < 80$ mm Hg

Stage 1 HTN: $130 / 80$ to $139 / 89$ mm Hg

Stage 2 HTN: $\geq 140 / 90$ mm Hg

Riley, et al.⁶

Results

- A total of 1325 and 2963 students were included from the AHO (urban) and Heartbytes (suburban) data, respectively
- Mean BMI among the urban population was 24.7 +/- 5.8, and 18.9% were classified as overweight with an additional 21.3% classified as obese
- Mean BMI among the suburban population was 20.6 +/- 4.9, and 10.1% and 5.6% were classified as overweight and obese, respectively
 - Difference between means of urban vs suburban was statistically significant ($P < 0.001$)
- Mean BMI of urban population was significantly higher in black vs non-black (25.6 +/- 5.9 vs 22.8 +/- 4.5, $P < 0.001$)
- Mean BMI of suburban population was significantly higher in black vs non-black (22.3 +/- 4.5 vs 20.6 +/- 4.9, $P < 0.001$)
- Elevated blood pressure or higher was more common in males vs females in both populations
 - Urban: Males - 34.6%, Females - 22.7%
 - Suburban: Males - 22.4%, Females - 19.9%

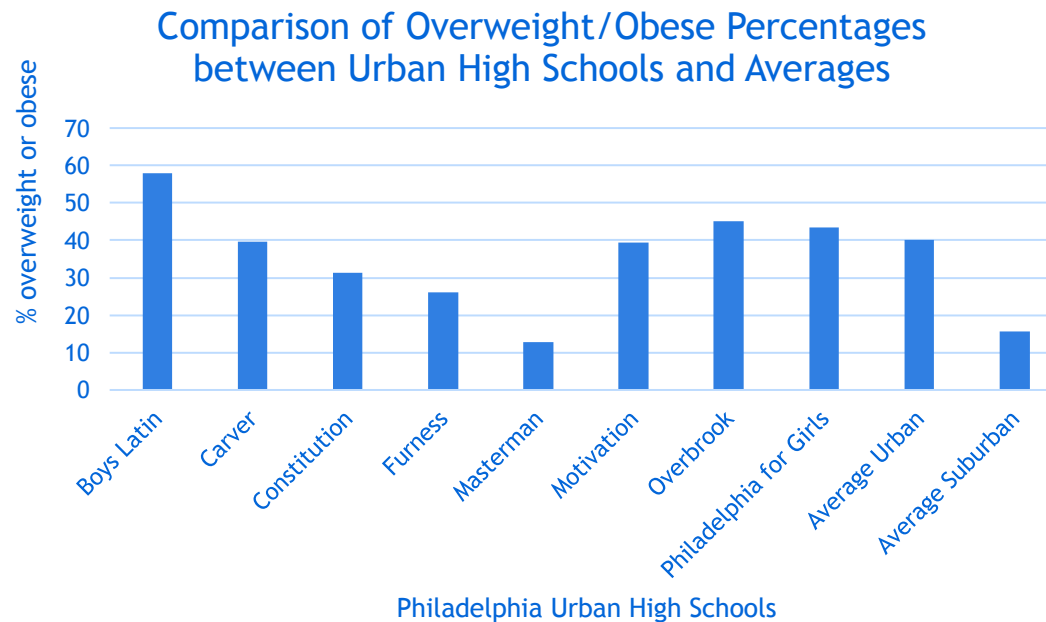
Results

Baseline Characteristics	Urban (N = 1325)	Suburban (N = 2963)
Age (years), mean (SD)	15.5 (1.3)	15.7 (1.2)
Sex, male, N (%)	775 (58.5)	1741 (58.8)
Race/Ethnicity, N (%)		
Black or African American	713 (64.4)	89 (3.0)
Hispanic or Latino	123 (11.1)	82 (2.8)
Asian	164 (14.8)	95 (3.2)
White	92 (8.3)	2586 (87.3)
Other	16 (1.4)	110 (3.7)
BMI, mean (SD)	24.7 (5.8)	20.6 (4.9)

Outcome Characteristics	Urban (N = 1325)	Suburban (N = 2963)
BMI Classification, N (%)		
Underweight	9 (0.7)	410 (13.8)
Normal/healthy weight	779 (59.2)	2089 (70.5)
Overweight	249 (18.9)	298 (10.1)
Obese	280 (21.3)	166 (5.6)
Blood pressure (mmHg), mean (SD)		
Systolic	115.1 (10.5)	111.5 (13.5)
Diastolic	72.4 (8.7)	67.7 (9.4)
Blood pressure classification, N (%)		
Normotensive	933 (70.7)	2160 (78.6)
Elevated	193 (14.6)	364 (13.2)
Stage 1 hypertension	155 (11.8)	149 (5.4)
Stage 2 hypertension	38 (2.9)	75 (2.7)

Results continued

- Boys' Latin of Philadelphia Charter School showed the highest prevalence of overweight/obese students while Masterman High School had the least



Conclusions

- Differences exist
 - BMI differences between urban and suburban populations
 - BMI differences between race/ethnicity for both populations
 - Blood pressure differences between urban and suburban populations
 - Blood pressure differences exist between males and females
- Further investigation of these differences is still needed to determine underlying causes
- Limitations
 - Retrospective study
 - AHO data representative?

Disclosures & Acknowledgments

- Continuing the project from Peri Levey and Kyle Prochno
- Athlete Health Organization⁴
 - A volunteer group that provides free, comprehensive health screenings and educational information to student athletes in underserved areas
 - Dr. Close is a volunteer physician
- Simon's Heart Heartbytes database⁵



<https://greatnonprofits.org/org/simons-heart>



Athlete**Health**Organization

<http://athletehealth.org/>

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