

**BIOGRAPHICAL SKETCH**

NAME: Sopher, Aviva B

eRA COMMONS USER NAME (credential, e.g., agency login): sophera

POSITION TITLE: Assistant Professor of Pediatrics

**EDUCATION/TRAINING**

INSTITUTION AND LOCATION	DEGREE	Completion Date MM/YYYY	FIELD OF STUDY
Barnard College, Columbia University, New York, NY	BA	05/1991	Biology, Chemistry
New York University School of Medicine, New York, NY	MD	05/1995	Medicine
Greenwich Hospital, Yale University, Greenwich, CT	Resident	06/1996	Internal Medicine, Preliminary
Institute of Human Nutrition, Columbia University Medical Center, New York, NY	MS	10/1999	Nutrition
Institute of Human Nutrition and the Body Composition Unit, Columbia University Medical Center, New York, NY	Postdoctoral Fellow	06/2003	Nutrition, Body Composition
Jacobi Medical Center, Albert Einstein College of Medicine, Bronx, NY	Resident	06/2006	Pediatrics
Division of Endocrinology, Diabetes and Metabolism, Department of Pediatrics, Columbia University Medical Center, New York, NY	Fellow	06/2010	Pediatric Endocrinology
Mailman School of Public Health, Columbia University Medical Center, New York, NY	MS	05/2014	Patient-Oriented Research/Biostatistics
Irving Institute, Columbia University Medical Center, New York, NY	NIH training grant	06/2015	KL2 Mentored Career Development Award

**A. Personal Statement**

I am an academic pediatric endocrinologist and hold Master's degrees in both Human Nutrition and Patient Oriented Research. I am a certified clinical densitometrist and am co-director of the Pediatric Bone Mineral Density Program at Columbia University Irving Medical Center. I have incorporated these aspects of my training to my clinical research, which focuses on body composition in adolescents and young adults with polycystic ovary syndrome and in pediatric bone disease.

- a) **Sopher AB**, Thornton JC, Wang J, Pierson RN Jr, Heymsfield SB, Horlick M. Measurement of percentage of body fat in 411 children and adolescents: a comparison of dual-energy X-ray absorptiometry with a four-compartment model. *Pediatrics*. 2004 May;113(5):1285-90. PubMed PMID: [15121943](#); PubMed Central PMCID: [PMC4418431](#).
- b) **Sopher AB**, Jean AM, Zwany SK, Winston DM, Pomeranz CB, Bell JJ, McMahan DJ, Hassoun A, Fennoy I, Oberfield SE. Bone age advancement in prepubertal children with obesity and premature adrenarche: possible potentiating factors. *Obesity (Silver Spring)*. 2011 Jun;19(6):1259-64. PubMed PMID: [21311512](#); PubMed Central PMCID: [PMC3637026](#).
- c) **Sopher AB**, Grigoriev G, Laura D, Cameo T, Lerner JP, Chang RJ, McMahan DJ, Oberfield SE. Anti-Mullerian hormone may be a useful adjunct in the diagnosis of polycystic ovary syndrome in nonobese adolescents. *J Pediatr Endocrinol Metab*. 2014 Nov;27(11-12):1175-9. PubMed PMID: [25003376](#); PubMed Central PMCID: [PMC4415850](#).
- d) Vuguin P\*, **Sopher AB\***, Roumimper H, Chin V, Silfen M, McMahan DJ, Fennoy I, Oberfield SE. Alterations in Glucose Effectiveness and Insulin Dynamics: Polycystic Ovary Syndrome or Body Mass

## **B. Positions and Honors**

### **Positions and Employment**

- 1999 - 2000 Research Assistant, Body Composition Unit, Columbia University Medical Center, New York, NY
- 1999 - 2003 Assistant Course Coordinator, Institute of Human Nutrition, Columbia University Medical Center, New York, NY
- 1999 - 2003 Visiting Lecturer, Institute of Human Nutrition, Columbia University Medical Center, New York, NY
- 2008 - 2014 Junior Assistant Attending, Department of Pediatrics, St. Luke's Roosevelt Hospital Center, New York, NY
- 2010 - Assistant Professor of Pediatrics, Columbia University Medical Center, New York, NY
- 2011 - 2015 Data Safety and Monitoring Board, Vitamin D for Sickle Cell - Respiratory Complications Study, Columbia University Medical Center, New York, NY
- 2013 - Pediatric Dual-Energy X-Ray Absorptiometry Program, Co-Director, Division of Pediatric Endocrinology, Diabetes and Metabolism, New York, NY
- 2016 - Faculty, Institute of Human Nutrition, Columbia University Medical Center, New York, NY

### **Other Experience and Professional Memberships**

- 2006 - Fellow, American Academy of Pediatrics
- 2006 - Diplomate, American Board of Pediatrics
- 2007 - Board Certified, Pediatrics, American Board of Pediatrics
- 2008 - Associate Member, The Endocrine Society
- 2009 - Associate Member, Pediatric Endocrine Society
- 2011 - Member, International Society for Clinical Densitometry
- 2011 - Certified Clinical Densitometrist, International Society for Clinical Densitometry
- 2012 - Board Certified, Endocrinology, American Board of Pediatrics
- 2014 - Member, Society for Pediatric Research

### **Honors**

- 1991 Phi Beta Kappa, Barnard College
- 1991 Magna Cum Laude, Barnard College
- 1991 Departmental Honors, Barnard College
- 2008 First Place (coauthor) 10th Annual Fellows' Poster Day, Department of Pediatrics, Columbia University Irving Medical Center
- 2009 First Place (1st Author), 11th Annual Poster Day, Department of Pediatrics, Columbia University Irving Medical Center
- 2009 Winner, ENDO Presidential Poster Competition, The Endocrine Society
- 2011 Special Commendation (senior author), 13th Annual Poster Day, Department of Pediatrics, Columbia University Irving Medical Center
- 2012 Full Scholarship, Master's Degree in Patient-Oriented Research, Mailman School of Public Health, Irving Institute for Clinical and Translational Research, Columbia University Irving Medical Center
- 2015 Early Investigators Award, The Endocrine Society Early Investigators Award, The Endocrine Society
- 2018 Presidential Poster Reception for best abstract, Pediatric Endocrine Society at Pediatric Academic Societies Meetings, Toronto, Canada (mentor)
- 2018 First Place, 20th Annual Poster Day, Department of Pediatrics, Columbia University Irving Medical Center (mentor)

### C. Contribution to Science

1. My initial clinical research project involved studying prepubertal children with premature adrenarche (PA), a hyperandrogenic state that occurs in girls under the age of 8 and boys under the age of 9 in the absence of true puberty. Although PA was initially thought to be a physiologic condition, it is now known to be associated with metabolic abnormalities including insulin resistance (IR) and dyslipidemia. Additionally, studies have suggested that PA is associated with body composition abnormalities such as increased visceral adipose tissue (VAT) and increased intramyocellular lipid deposition (IMCL). We found that prepubertal girls with PA had greater bone mineral content and density compared to controls. We hypothesized that androgen excess may play a role in the difference seen between the groups. I then proceeded to attempt to understand why children with PA commonly have advanced bone age compared to controls. We found that subjects whose bone age (as a ratio of bone age to chronological age (BA/CA)) was in the top tertile had the highest levels of adrenal and gonadal androgens and the highest weight. Additionally, children with PA had greater BA/CA at any given weight when compared to controls. We thus hypothesized that hormonal factors likely potentiated the effect of obesity on bone age advancement in children with PA. In another study we found no difference in VAT, IMCL or percentage body fat between children with PA and controls. Most recently, we found that there was no difference in the prevalence of the metabolic syndrome between PA and controls. Our conclusion was that although PA is associated with development of metabolic abnormalities, these abnormalities may not be apparent in young prepubertal subjects.
  - a. **Sopher AB**, Thornton JC, Silfen ME, Manibo A, Oberfield SE, Wang J, Pierson RN Jr, Levine LS, Horlick M. Prepubertal girls with premature adrenarche have greater bone mineral content and density than controls. *J Clin Endocrinol Metab.* 2001 Nov;86(11):5269-72. PubMed PMID: [11701690](#); PubMed Central PMCID: [PMC4415849](#).
  - b. **Sopher AB**, Gerken AT, Lee EJ, Blaner WE, Deeds S, Gallagher D, Shungu DC, Mao X, Hassoun A, Mahon DJ, Oberfield SE. Retinol-binding protein 4 correlates with triglycerides but not insulin resistance in prepubertal children with and without premature adrenarche. *J Pediatr Endocrinol Metab.* 2011;24(9-10):683-7. PubMed PMID: [22145457](#); PubMed Central PMCID: [PMC3646629](#).
  - c. **Sopher AB**, Jean AM, Zwany SK, Winston DM, Pomeranz CB, Bell JJ, McMahon DJ, Hassoun A, Fennoy I, Oberfield SE. Bone age advancement in prepubertal children with obesity and premature adrenarche: possible potentiating factors. *Obesity (Silver Spring).* 2011 Jun;19(6):1259-64. PubMed PMID: [21311512](#); PubMed Central PMCID: [PMC3637026](#).
  - d. Williams KW, Oberfield SE, Zhang C, McMahon DJ, **Sopher AB**. The relationship of metabolic syndrome and body composition in children with premature adrenarche: is it age related? *Hormone Research in Paediatrics*, 2015;84(6):401-7. PMID: [26513727](#); PubMed Central PMCID: [PMC4684742](#)
2. I was able to merge my training in medicine and nutrition by performing body composition research. Using a pediatric database of 411 children and adolescents I compared the use of dual-energy x-ray absorptiometry (DXA) for measurement of percentage body fat compared to the gold standard, the four-compartment model. In this study I found that there was a strong relationship between these methods with an  $R^2$  of 0.85. Compared to the four-compartment model, DXA underestimated percentage body fat in those with lower percentage body fat and overestimated it in those with higher percentage body fat. The results of this study support the use of DXA as a body composition tool in pediatrics, which is easier to use and more accessible than the cumbersome four-compartment model. I was also involved in a study to better understand the predictability of body mass index for body fat in children and adolescents. In a cohort of 1196 children and adolescents we found that body mass index is an appropriate screening test but is not diagnostic of level of adiposity. I was a post-doctoral research fellow when working on this research.
  - a. Sopher AB, Thornton JC, Wang J, Pierson RN Jr, Heymsfield SB, Horlick M. Measurement of percentage of body fat in 411 children and adolescents: a comparison of dual-energy X-ray absorptiometry with a four-compartment model. *Pediatrics.* 2004 May;113(5):1285-90. PubMed PMID: [15121943](#); PubMed Central PMCID: [PMC4418431](#).

- b. Freedman DS, Wang J, Thornton JC, Mei Z, Sopher AB, Pierson RN Jr, Dietz WH, Horlick M. Classification of body fatness by body mass index-for-age categories among children. Arch Pediatr Adolesc Med. 2009 Sep;163(9):805-11. PubMed PMID: [19736333](#); PubMed Central PMCID: [PMC2846460](#).
  - c. Wilkes M, Thornton J, Horlick M, **Sopher AB**, Widen E, Wang J, Pierson R, Gallagher D. Relationship of BMI z score to fat percent and fat mass in multiethnic prepubertal children. Pediatric Obesity 2019. DOI:10.1111/ijpo.12463. PMID 284784437
3. During my fellowship in pediatric endocrinology I became interested in the possible relationship between PA and polycystic ovary syndrome (PCOS). Both of these disorders are hyperandrogenic states and both are associated with the metabolic syndrome and other abnormalities. Recently, a connection between PCOS and NAFLD has been described. My current overall goal is to better understand the relationship between PCOS and NAFLD in adolescents and young adults. We found that intrahepatic lipid content (IHL) was higher in nonobese adolescents with PCOS than controls, although we did not find correlations between IHL and triglycerides or IR. I am currently running a randomized clinical trial of metformin vs placebo in adolescents and young adults with PCOS who have elevated percentage liver fat by MRI to see if there is a beneficial effect. I have also been interested in studying biomarkers, which may be useful in the challenging process of making a diagnosis of PCOS in adolescents and young adults. We found that anti-mullerian hormone (AMH) was higher in PCOS than controls and that AMH correlated with androgen levels, ovarian size and increased ovarian follicles. We also found that PCOS subjects were 1.49 times more likely than controls to have an AMH level of greater than 3.4 ng/mL. Most recently, we found that abnormal glucose dynamics in adolescents with PCOS is mostly related to degree of obesity. My role in this research was as the Principal Investigator.
- a. Sopher AB, Gerken AT, Blaner WS, Root JM, McMahon DJ, Oberfield SE. Metabolic manifestations of polycystic ovary syndrome in nonobese adolescents: retinol-binding protein 4 and ectopic fat deposition. Fertil Steril. 2012 Apr;97(4):1009-15. PubMed PMID: [22341881](#); PubMed Central PMCID: [PMC3839977](#).
  - b. Sopher AB, Grigoriev G, Laura D, Cameo T, Lerner JP, Chang RJ, McMahon DJ, Oberfield SE. Anti-Mullerian hormone may be a useful adjunct in the diagnosis of polycystic ovary syndrome in nonobese adolescents. J Pediatr Endocrinol Metab. 2014 Nov;27(11-12):1175-9. PubMed PMID: [25003376](#); PubMed Central PMCID: [PMC4415850](#).
  - c. Vuguin P\*, **Sopher AB\***, Roumimper H, Chin V, Silfen M, McMahon DJ, Fennoy I, Oberfield SE. Alterations in Glucose Effectiveness and Insulin Dynamics: Polycystic Ovary Syndrome or Body Mass Index, Horm Res Paediatr 2017; 87(6):359 – 367. Pubmed PMID: [28478437](#). PubMed Central PMCID: [5914159](#). \*Both authors contributed equally to this paper.
3. Complementing my research in body composition, I am pursuing research in pediatric bone disease and treatment. I am a certified clinical densitometrist by the International Society of Clinical Densitometry. Our Division has IRB approval to collect data on pediatric patients who have dual-energy x-ray absorptiometry (DXA) performed for clinical indications. Our initial goal is to publish data that examines pediatric diagnoses associated with referral for DXA testing, whereas our long-term goal is to propose pediatric bone research protocols that examine use of alternate sites for pediatric DXA and peripheral quantitative computed tomography. I was first author of an invited review that discusses pediatric bone development, disease and treatment.
- a. Sopher AB, Fennoy I, Oberfield SE. An update on childhood bone health: mineral accrual, assessment and treatment. Curr Opin Endocrinol Diabetes Obes. 2015 Feb;22(1):35-40. PubMed PMID: [25517023](#); PubMed Central PMCID: [PMC4405140](#).

## **D. Additional Information: Research Support and/or Scholastic Performance**

### **Pending Support**

RO1DK122077, Evaluation of the Families Improving Health Together Program, (PI M. Rosenbaum) 7/01/19-6/30/24

Role: Coinvestigator

### **Completed Research Support (Past 5 years)**

00000, Empire Clinical Research Investigator Program, New York State, Department of Health

Rosenbaum M(PI)

Improving Population Health through Care Coordination

\$1,260,332

07/01/16-06/30/18

Efficacy of Vitamin D Replacement in Pediatric Obesity

To observe the effect of two different dosages of vitamin D on vitamin D levels, bone markers, inflammatory markers and body composition in vitamin D deficient obese children

Role: Co-Investigator

KL2TR000081, NIH

Ginsberg H (PI)

07/01/13-06/30/15

Effect of metformin on insulin resistance, non-alcoholic fatty liver disease and body composition in nonobese adolescents with polycystic ovary syndrome

The goal of this grant is to provide didactic training, mentoring, exposure to multidisciplinary research and ongoing evaluation to prepare young investigators for a career in patient oriented research.

Role: Scholar