APPLICATION INFORMATION

I. Principal Investigator Information

Title of Project

Title: Changes in the Recreational Built Environment and Youth BMI in [redacted]

Principal Investigator Information

[redacted]

Mentor Information

[redacted]

Department Chair Information

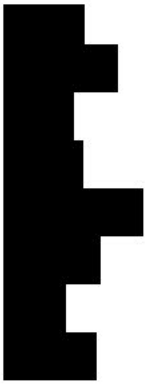
First name:

Last name:

Degree:

Department:

Position:



Primary Funding Path:
APA Young Investigator Award

Changes in the Recreational Built Environment and Youth BMI
in [redacted]

[redacted]

Funding Mechanism
Academic Pediatric Association Young Investigator (APA YIA)

Primary Mentor

[redacted]

Division Director Name

[redacted]

Department Chair Name

[redacted]

Participation Statement
If funded, I agree to participate in any conference calls and/or in-person grantee meetings (requirements vary by funding track).

[redacted]

Specific Aims

Childhood obesity remains a significant national and local public health priority.[1,2] Approximately 17% of U.S. children have obesity and another 16% have overweight.[1] Minority and low socioeconomic status (SES) children are disproportionately affected by obesity, increasing their risk of cardiovascular disease as adults.[1,4] [redacted] statistics are worse than the national average: **thirty percent of high school students have overweight or obesity**.[2] In response to these concerning outcomes, [redacted] has made changes to the recreational built environment throughout the city to decrease risk of obesity.[5-7] Key citywide recreational environment changes include one-mile marked walking loops, new bike lanes, trails access points and sidewalks.[7,8] This presents the opportunity for the evaluation of a natural experiment, as the relationship between environmental changes like these and childhood BMI, particularly in minorities and low SES children remains unclear.

Changing the recreational built environment to decrease the prevalence of obesity may not be equally effective for all children. Individual sociodemographic and neighborhood socio-environmental factors interact with neighborhood recreational opportunities to determine risk of childhood obesity.[3] **(Figure 1)** In partnership with Dataworks [redacted], a community-engaged neighborhood mapping organization,[9] we will improve upon previous cross-sectional assessments of environmental correlates of childhood obesity by **accounting for key individual and neighborhood-level modifying factors** while assessing the **effects of environmental change.**

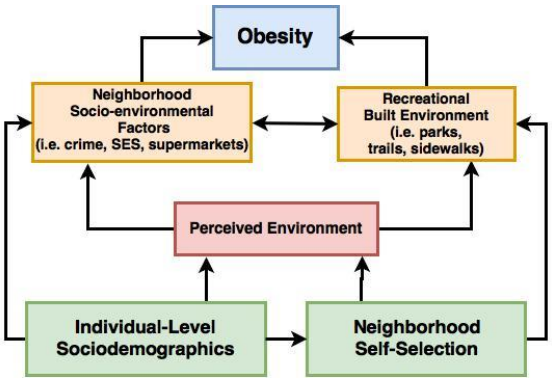


Figure 1: Relationship between individual and environmental factors and childhood obesity. Adapted from Boone-Heinonen and Gordon-Larsen, 2012.[3]

This work builds upon the principal investigator's strong foundation of research focusing on the role of the environment in childhood obesity and cardiovascular disease. The data and

community connections from this project will inform the principal investigator's planned career development award proposal utilizing geographic data and perceived environmental data to inform a community-engaged childhood obesity initiative.

Aim 1: To determine whether neighborhood recreational built environmental changes (parks, walking trails, biking trails and recreational facilities) are associated with change in BMI percentile in [redacted] youth (ages 5 to 18) from 2012 to 2017

Hypothesis: *Using longitudinal measures of individuals' BMI percentile obtained from electronic medical records data in combination with geotagged recreational opportunities, changes in neighborhood recreational built environment will be associated with cumulative changes in BMI percentile in [redacted] youth.*

Aim 2: To determine if there are differences in the effects of neighborhood recreational built environmental changes on BMI percentile by individual age, sex, race/ethnicity and insurance type

Hypothesis: *The effects of these recreational built environmental changes on BMI percentile will be greater for the following groups: preadolescent children, males, non-Hispanic white children and privately insured children.*

Aim 3: To determine if there are differences in the effects of neighborhood recreational built environmental changes by socio-environmental characteristics (neighborhood socioeconomic status, community reported crime, supermarket and restaurant characteristics)

Hypothesis: *The effects of recreational built environmental changes will be greater in the following socio-environmental contexts: higher socioeconomic status, lower community reported crime, more supermarkets and fewer fast food restaurants.*

Background and Significance

Eliminating racial/ethnic and socioeconomic disparities in the prevalence childhood obesity remains a continuing challenge.[1] Because neighborhood environmental factors contribute to these disparities, delineating environmental correlates of childhood obesity may reveal modifiable factors which can be addressed at the community-level.[10,11] However, **there are many gaps in this research** despite its promise. Neighborhood recreational built environmental factors thought to promote physical activity such as sidewalks, bike lanes, parks, and trails have yielded inconsistent relationships with physical activity and child BMI.[12-14] These inconsistent results may be due to unaccounted for individual sociodemographic and socio-environmental factors as well as reliance on cross-sectional designs.[15-18]

Examination of the effect of the neighborhood recreational environment must take into account individual sociodemographic factors.[17,19,20] Age, sex, race/ethnicity, and individual insurance type, as a proxy for household SES, may modify the relationship between the built environment and BMI percentile.[21,22] This may be due to differences in environmental perceptions and cultural norms. Parents may restrict access to neighborhood recreational opportunities in younger and female children due to safety perceptions.[23] Race/ethnicity may impact environmental exposures as minorities are less likely to feel safe than non-minorities which may limit their use of nearby public recreational opportunities.[24,25] Recreational environment use may differ among sociodemographic groups due to differences in sense of belonging and local culture.[15,18] The potential for sociodemographic differences signifies the importance of assessing for individual-level effect modification in this study, and will guide a subsequent qualitative assessment of neighborhood environmental perceptions among [redacted] families.

Although some studies of environmental correlates of childhood obesity have accounted for individual-level modifiers, few studies have assessed socio-environmental effect modification.[11,26] Neighborhood SES, food environment and community crime are

neighborhood environmental indicators which are associated with childhood obesity.[10,26,27] The examination of environmental effect modification in behavioral obesity interventions has demonstrated the contexts in which these interventions are more effective.[26] Similarly, including these factors in our proposal as effect modifiers will demonstrate the **contexts** in which recreational built environmental changes are more or less effective and will guide future community-level interventions.

In addition to the inclusion of individual and socio-environmental factors, this study improves upon previous studies by utilizing recent changes in [redacted] as a **natural experiment** in which to examine the effect of environmental changes on childhood obesity. Natural experiments have the advantage of evaluating real-world changes at the population-level which can be translated into community or policy-level change.[28]

Significance and Commitment to APA Priorities

The proposed study will be one of the first to estimate demographic and socio-environmental differences in the effect of citywide recreational environmental changes on childhood obesity, a pediatric health priority. We leverage a natural experiment to strengthen the argument for causality in an area of research where cross- sectional studies predominate.[14,29]

Our proposed study speaks directly to the APA's commitment to community partnership and health equity. This proposal was formed in partnership with **Dataworks** [redacted] a local community-engaged neighborhood mapping organization. My ultimate goal is to develop targeted, **environmentally-tailored obesity initiatives which may benefit traditionally disadvantaged groups because environmental factors contribute to racial/ethnic disparities**.[10,30,31] Interventions, such as REACH US in adult African American communities, demonstrate the potential of initiatives based on environmental data and community engagement to successfully improve racial/ethnic disparities in obesity prevalence.[32] This work

will realize the APA's vision of an academic community that "ensures optimal health and well-being of all children, particularly those most vulnerable."

Methods

Study Population

[redacted] Children's Primary Care is one of the largest single providers of pediatric primary care in the city of [redacted] with three sites across the city. Over half of the clinic's [redacted] city patients are racial or ethnic minorities and approximately half are Medicaid beneficiaries.

Location of residence, sex, height, weight, race/ethnicity and type of insurance will be collected from already geocoded electronic medical records of patients presenting for annual well visits aged 5-18 years from 2012 to 2017 with residences within the city of [redacted] (N=25,060). The 5-18 year old age range was selected in order to assess the outcome in both children and adolescents for whom environmental associations with BMI percentile may be different.[33] Children's data will be excluded if they have: (1) a residential address outside of the city of [redacted] at any time from 2012 to 2017; (2) medical diagnoses which would potentially affect growth, nutrition; (3) history of or current pregnancy; (4) a physiologically implausible BMI measurement based on 2000 CDC Growth Chart reference data; (5) fewer than three well child visit BMI measurements between 2012 and 2017.[10]

Outcome Data

BMI percentile will be calculated based on height, weight, age and sex at each well child visit based on 2000 CDC Growth Chart Reference Data. Measures from each annual well child visit during the time period will be included in the analysis. BMI percentile is considered more appropriate for longitudinal studies than BMI z-score.[34]

Environmental Data

Environmental data will be extracted from multiple data sources including [redacted] Parks and Recreation, the U.S. Census and Dataworks [redacted] city maps, by

[redacted], urban planner and co-investigator.[9] **(Table 1)** The child's surrounding neighborhood environment will be characterized based on the distance of recreational features from the child's residential address, and the density of features within an 800m street network buffer around the child's residence at the time of each clinic visit, similar to previous studies.[10,33] Neighborhood SES will be determined based on census block group data. While an incomplete measure of the food environment, supermarket and fast food restaurant data will also be obtained from existing contemporaneous datasets.

Table 1: Environmental Variables

Recreational Built Environmental Variables[10,35]	**Source**	**Measurement**
Public parks	City of [redacted] [redacted] Parks and Recreation[36,37]	Road network distance
Trail access points	City of [redacted]; [redacted] Parks and Recreation[36,37]	Road network distance
Bike lanes	City of [redacted][36]	% roads within buffer[a] with bike lanes
Public recreational facilities	City of [redacted]; [redacted] Parks and Recreation[36,37]	Road network distance
Sidewalks	City of [redacted][36]	% roads within buffer[a] with sidewalks
Average annual daily traffic volume	City of [redacted][36]	Mean volume within buffer
Traffic speed limits	City of [redacted][36]	% of street length within buffer[a] with ≤ 35 mph speed limit[38]
Intersection density	City of [redacted][36]	Number of intersections per square km within buffer[35 a,b]
Socio-environmental Variables[10]		
Neighborhood SES	US Census Bureau	Census Block Group
Community Reported Crime	Dataworks [redacted][9]	Density within buffer[a]
Food Environment Variables[33]		
Supermarkets	Dataworks [redacted][9]	Network Distance
Fast Food	Dataworks [redacted][9]	Density within buffer[a]

[a] 800m road network buffer
[b] Intersection: points where 3 or more road segments come together

Analysis Plan

The proposed study will estimate the effect of recreational built environmental changes (i.e. trail access points and bike lanes) on the primary outcome, change in BMI percentile for age and sex (Aim 1), assess heterogeneity of this effect by child age, race/ethnicity and insurance type (Aim 2), and additionally assess differences in this effect by neighborhood-level socio-environmental characteristics including socioeconomic status, food environment and community reported crime (Aim 3).

Aim 1

The effect of neighborhood recreational built environmental changes on BMI percentile for age and sex will be estimated using multilevel linear regression, with repeated measures nested within individuals, who are nested within neighborhoods. Models will be adjusted for relevant neighborhood and individual level confounding factors, like individual insurance type and neighborhood socioeconomic status. This modeling approach has multiple benefits. First, the longitudinal structure of the data enables estimation of within-person change in BMI percentile for age and sex. Using repeated measures on the same individuals, patients serve as their own controls. A change in a patient's BMI percentile attributable to a change in their neighborhood environment can be estimated, while controlling for characteristics of the neighborhood or individual that might confound the estimated effect. Second, a random effects approach on the nested data enables us to quantify the degree of variance in BMI percentile change attributable to the time period, the individual, and the neighborhood. This can inform intervention design by identifying, for example, whether patient-focused or neighborhood focused programming will have a larger population effect on BMI percentile.

Aim 2

To assess whether neighborhood recreational built environmental changes are more beneficial to some subgroups than others, we will estimate stratum-specific effects. Using an interaction term between the main exposure and the modifier, we will estimate the independent

effect of the environmental change on BMI percentile for age and sex among younger children, adolescents, children of minority race/ethnicity, white children, children on Medicaid, and children on private insurance.

Aim 3

We will additionally assess whether neighborhood recreational built environmental changes are more beneficial within certain neighborhood contexts than others. Using an interaction term, we will estimate the effect of recreational built environmental changes on BMI percentile for age and sex among neighborhoods stratified by median household income, community-reported crime, supermarket distance and fast food restaurant density.

Power Calculation

Our initial analyses will include children who have not changed residence for at least three years during the study period (N=16,504). We will additionally perform a sensitivity analysis to quantify the bias in estimated effects introduced by excluding children who change residence. We assessed power to detect the longitudinal association between environmental change and BMI percentile for age and sex. Using our restricted sample size of 16,504, an assumed 80% correlation between two repeated BMI percentile measurement and a 10% correlation between residents of the same neighborhood (boundaries defined by Dataworks [redacted][9]). The latter measure was informed by the highest correlation reported in an analysis of spatial autocorrelation in BMI percentile at a similar aggregation level.[39] We have 99% power to detect a mean change in BMI of 10 percentage points (variance = 15). We also estimated power in the smallest stratum of interest, white children (N=2,322). We have 98% power to detect a 10 percentage point average change in BMI in this subgroup.

In both power calculations, we simulated 10,000 data generations and t-tests for mean differences using these parameters and stipulating a p-value significance threshold of 0.05. We conducted these calculations in R.

One notable limitation to this study, consistent with previous studies of environmental correlates of obesity, is that we will not be able to control for neighborhood self-selection.[3,40] Families more likely to be active may chose neighborhoods with more nearby recreational opportunities. However, by assessing changes in the environment, self-selection bias may be less in our study than in cross-sectional studies as it is easier for families who are able to move to choose based on present recreational opportunities than the potential for future recreational opportunities.

Goals for Faculty Development in Preventive Services Research

The overall goal of my career is to elucidate environmental factors which mediate child health disparities and translate this work into community-engaged place-based initiatives to mitigate these disparities. This proposal builds upon my foundation of research experience and training as an NRSA fellow at the University of [redacted] while permitting greater experience **collaborating with community organizations** and **performing geographic analyses**. I have assembled a strong, multidisciplinary team including Dr. [redacted], an internationally-recognized expert in childhood obesity, and [redacted], urban planner, Director of Dataworks [redacted], a community-engaged neighborhood mapping organization. The proposed work will provide objective data which will inform a career development award focusing on the development of community-engaged place-based initiatives using objective and perceived environmental data to decrease disparities in childhood obesity.

Timeline

	2018											2019	
	Feb	Mar	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan[2]	Feb
IRB and Admin													
Data Acquisition													
Data Cleaning													
Aim 1 Analysis													
Aims 2 and 3 Analysis													
Submission of First Manuscript													
Submission of PAS abstract[1]													
Submission of AcademyHealth abstract													
Submission of second manuscript													
Submission of K award													

[1]Pediatric Academic Societies
[2]Conclusion of project funding

Key Personnel	**Role**	**Responsibilities**
[redacted], MD	Principal Investigator	Study design, analysis, manuscript preparation
[redacted], MD, MPH	Primary Mentor	Mentorship
[redacted], MD, MPH	National Mentor	Mentorship
[redacted], MCRP, AICP	Co-Investigator, Director of Dataworks [redacted], Urban Planner	Study design consultation, geospatial analysis
[redacted], MS	Co-Investigator, Social Epidemiologist	Study design consultation, geospatial and statistical analysis
TBD	Research Assistant	Assist with study execution, compliance, publication, publicity

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors in the order listed on Form Page 2.

Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME [redacted], MD	POSITION TITLE NRSA Primary Care Research Fellow Clinical Instructor, Division of General Pediatrics and Adolescent Medicine University of [redacted]
eRA COMMONS USER NAME (credential, e.g., agency login)	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

A. Personal Statement

My previous work, current mentorship and career trajectory make me an ideally suited candidate for the Academic Pediatric Association's Young Investigator Award. As a pediatric health services researcher and NRSA postdoctoral fellow, my research focuses on built environment and socio-environmental factors which contribute to disparities in obesity and cardiovascular disease in children and young adults. I am utilizing my fellowship to develop specific expertise in geographic information systems, spatial analysis and community-engaged research.

My previous work as a clinical trainee provided the initial groundwork for my current research direction. As a pediatric cardiology fellow, I noted racial and geographic disparities in the incidence of sudden cardiac death in youth, and led a study to determine whether there were school and county-level disparities in access to automated external defibrillators. This study provided experience in the use of publically available geographic data and ecological analyses. Three manuscripts resulted from this work.

During my first year of fellowship at the University of [redacted], I conducted a secondary analysis of the effect of local commute times on family health behaviors related to obesity. This work was presented as a platform presentation at the 2017 Pediatric Academic Societies National Conference and is currently under review at *Academic Pediatrics*.

I am currently conducting a neighborhood survey in [redacted], a small town in [redacted] with high levels of cardiovascular disease and obesity. I am leading a multidisciplinary team with the goal of determining whether there is environmental effect modification of the outcomes of an ongoing cardiovascular disease prevention trial in African American adults.

Dr. [redacted], my primary mentor on the proposed project, has been my mentor since July 2016. A nationally recognized expert on childhood obesity, she has provided consistent one-on-one mentorship in multidisciplinary obesity research, professional development and grant-writing. She has incorporated me as a fellow within the [redacted] Research since its inception in January 2017.

In my ongoing work, I am creating a narrative of research dedicated to environmental factors related to disparities in child health. The proposed project is innovative, multidisciplinary and evinces the type of community partnerships I will continue to develop. In partnership with Dataworks, [redacted], a community-engaged neighborhood mapping organization, we will determine associations between the changing built environment in [redacted] and child BMI. This project will provide initial data for a Career Development Award aimed at the development of community-engaged initiatives framed by objective and perceived environmental data to decrease disparities in childhood obesity.

B. Positions and Honors

List in chronological order previous positions, concluding with the present position. List any honors. Include present membership on any Federal Government public advisory committee.

Institution	Position/Title	Dates
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

Professional Societies and Advisory Committees

Academic Pediatric Association 2010-

[redacted]

Awards

[redacted]

Appointed Positions

[redacted]

C. Contribution to Science

My research focuses on both built environment and socioenvironmental factors which contribute to health disparities in children and young adults. I have applied this work largely to disparities in obesity and cardiovascular disease.

1) <u>Describing Disparities in Cardiac Emergency Preparedness at the School-Level and County-Level</u>

I led one of the first studies to assess school-level racial and socioeconomic differences in access to cardiac emergency preparedness measures. We found that larger schools and schools with more minority students had fewer Automated External Defibrillators per student. Also, schools with larger populations of students of lower socioeconomic status were less likely to have a cardiac emergency response plan. Subsequent analyses demonstrated that schools in poorer, less populated counties were less likely to have a cardiac emergency response plan. Unequal distribution of AEDs and lack of cardiac emergency preparedness may contribute to disparities in outcomes of sudden cardiac arrest in youth and young adults.

[redacted]

2) Determining Associations Between Neighborhood Commute Times and Caregiver-Infant Health and Feeding Behaviors

This is the first study to describe associations between neighborhood commute times (time spent commuting to work averaged at the neighborhood level) and the health and feeding behaviors of caregivers and infants. We found that caregivers living in higher commute time areas reported less physical activity, less perceived food choice and less access to markets with fresh produce. Through this mechanism commute time, as a neighborhood-level factor, may be obesogenic for children and caregivers.

[redacted]

D. Research Support

Award	Amount	Status
[redacted]	[redacted]	[redacted]

Current Projects

1) [redacted]

2) [redacted]

3) [redacted]

Previous Projects

5) [redacted]

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: [redacted]

eRA COMMONS USER NAME (credential, e.g., agency login): [redacted]

POSITION TITLE: Professor of Pediatrics (tenured)

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

A. Personal Statement

I am ideally suited to be a primary mentor on this proposal. I am an experienced mentor, having mentored numerous junior faculty members (including K awards) as well as dozens of other trainees at all levels. I have been the primary mentor to 4 YIAs (including one Research in Academic Pediatrics Initiative on Diversity or RAPID, one Nutrition in Underserved Settings, and one APA/Bright Futures Award). I am also the incoming [redacted] for the APA. Importantly, I have worked with Dr. [redacted] for over 1.5 years, and we have a productive relationship. I was previously the Associate Director of [redacted] T32 for many years (the fellowship for which I am Dr. [redacted] primary mentor).

I am also an internationally recognized leader in pediatric obesity prevention research, with expertise in obesity prevention, health disparities, physical activity, study design, health services, and environment-obesity relationships. I have been PI on an NICHD multiple-PI R01 and its renewal --a multi-site, clinical randomized controlled trial of a low-literacy, low numeracy-oriented obesity intervention. This grant has investigated obesity prevention in a large, diverse population (N>860) with 50% Latino enrollment. I have been the PI, Co-Investigator or mentor on numerous other studies of obesity, its prevention, and its environmental correlates.

I am a tenured Professor of Pediatrics at the [redacted], Chief of the Division [redacted] Research, a new multi-disciplinary obesity center. I am a board-certified and experienced pediatrician, who has provided primary care including many youth with overweight and minority youth throughout my career.

Finally, I have a long term mentoring relationship with the candidate, am committed to her success, and look forward to continuing our collaborations.

a. [redacted]

[redacted]

B. Positions and Honors

Positions and Employment

[redacted]

Honors

[redacted]

C. Contribution to Science
My work, like the study of obesity itself, is highly interdisciplinary. I collaborate with faculty from medicine (pediatrics, endocrinology, psychiatry, family medicine), nursing, basic science, dentistry, nutrition, psychology, journalism, health behavior, and sociology toward the following five major contributions:

My research provided a roadmap for pediatricians and families for talking about BMI and for achieving healthier BMI trajectories. In 2000, the CDC came out with BMI charts for children and there were many guidelines for physicians about ways to help prevent and treat obesity, but both families and pediatricians found BMI screening difficult. One of my early publications (in the *Journal of Pediatrics)* presented the first evidence of the usefulness of BMI percentiles in identifying the overweight child; it was declared one of 2004's 10 best articles by *Contemporary Pediatrics*. Two other publications showed that primary care pediatricians were well positioned to prevent and treat childhood obesity but faced a range of barriers.

a. [redacted]

My research had immediate impact on practice by improving weight screening and dietary and physical activity counseling in primary care pediatrics as well as improving communication in primary care, especially for socioeconomically and racially/ethnically diverse populations. With colleagues, I developed and then demonstrated the utility of color-coded BMI charts in reducing disparities and facilitating communication. My team and I have focused on critical racial and ethnic variables in developing clinical recommendations. In 24 interviews with white and African-American parents, we have showed that parents welcome BMI screening and recommendations when they are *health*-based. From these interviews and other formative work, we built and pilot tested a toolkit to communicate BMI with the first ever evidence of changing parental perception of overweight and healthy lifestyle change while boosting providers' self-efficacy. This is critical as my work has revealed that 75% of parents of overweight children report never having heard this from their health care providers [redacted] Another recent paper is one of the first to explore relationships between race and ethnicity and parenting behaviors related to obesity in a cohort of very poor, diverse infants [redacted]. Much of my work shows how literacy impacts parents understanding of physicians instructions, including growth charting.

a. [redacted]

My team -- [redacted] **--**has also **explored the relationship between BMI and health** using the National Health and Nutrition Examination Study (NHANES). One influential study revealed that obese children as young as 3 have serum inflammatory markers, and by age 9, more than 80% of very obese children have abnormal CRP values vs. 12% of healthy weight children. This work was presented at the prestigious Presidential Plenary Platform at the Pediatric Academic Societies (PAS) meeting and published in *Pediatrics*.The study received significant lay press attention as well as acknowledgement by the Surgeon General as a "silent" marker of

cardiovascular disease in obese children. One recent paper that received national attention was published in the *New England Journal of Medicine* and showed the high rates of cardiometabolic risk factors among those with severe obesity. Now I am leading a new research center with resources from the [redacted]

a. [redacted]

In [redacted], I was one of four Multiple PIs funded with a 5-year NICHD R01 (and a 5 year competitive renewal) to perform a cluster randomized clinical trial to evaluate a health literacy/health communication intervention on early obesity prevention at four academic pediatric primary care clinics. We were one of the first groups to enroll English- and Spanish-speaking families with very young infants (age 2 months) and follow them until 5 years of age. Throughout the child's early life, multiple measures are collected related to health literacy and numeracy, nutrition and physical activity, injury prevention, perception of health communication, and more. Recruitment of 865 families at the 2 month well child visit was completed in September, 2012. Several supplemental federal and regional grants related to the original study have been funded, including two large supplements to study early injury prevention disparities.

Like my previous work, this project is on target to yield important recommendations for pediatric practice but so far, we have learned how many infants already have behaviors putting them at high risk for obesity. We have also developed numerous health outcome measures.

a. [redacted]

Perhaps the most groundbreaking aspect of my work is what I have learned from health services research, qualitative research and clinical settings and applies it to building and testing tools and strategies in school, community, and especially clinic, settings. **My last contribution is how crossing disciplinary and professional boundaries and methodologic approaches can paint a picture of how to help children grow up healthier and adults live healthier**. One example is how many children's movies contain obesogenic and stigmatizing messages.

a. [redacted]

Complete List of Published Work in MyBibliography:

[redacted]

D. Research Support

Ongoing Research Support

[redacted]

[redacted]

Completed Research Support

[redacted]

[redacted]

December 20, 2017

Dear APA Young Investigator Award Review Committee,

I am writing to convey my absolute strongest support as a mentor for [redacted], MD, a second year fellow in the National Research Service Award (NRSA) Primary Care Research Fellowship as she applies for the second round of the APA Young Investigator Award. I know that the APA Young Investigator award will be a wonderful investment in what promises to be a bright future. Her proposal to examine changes in the built environment in [redacted] and their relationship to BMI is innovative and will have significant implications. I have enjoyed working with her on this full proposal, and I look forward to --and am wholeheartedly committed to --mentoring her on this project. In so doing, I will draw from my previous experience mentoring over 30 other individuals -- faculty, clinical research fellows, residents, students, and several previous APA Young Investigator awardees to ensure the success of this project.

I have served as Dr. [redacted]'s primary research mentor during her fellowship, and it has been my distinct pleasure to work closely with her on several research efforts and meet with her weekly. She is a talented, innovative, and collaborative clinician-scholar and a rising star. Her interest in health disparities and place-based health research in childhood has led her to explore the areas she writes about in this proposal. Dr. [redacted] is especially qualified for the research proposed because of her general pediatric training, research skills, and previous research experience, but also because she brings the true "fire in her belly" to conduct important, high-impact scholarly work.

Dr. [redacted] comes to this application well-prepared. She completed her pediatric residency training at the University of [redacted] where she demonstrated initiative by conducting a qualitative study assessing barriers to emergency pediatric care in rural [redacted]. Later, as a pediatric cardiology fellow, she published three manuscripts on Sudden Cardiac Death in Youth. We recruited her to our NRSA fellowship, and I have enjoyed working with her closely as she has strengthened her skillset by completing didactic courses in biostatistics, epidemiology, healthy policy, health behavior, and through engagement in multiple projects.

In her time as a NRSA fellow, she has proven herself to be a creative, innovative, and collaborative force. She has explored race-based health disparities, culture-health links, place-base and social capital effects, all with a particular interest in rural health, itself an understudied but crucial area. She also has strong interests in global health, examining access to pediatric care in developing nations. At each step along the way, she has sought out ways to learn new methods, approaches, theories, and data sources to be a more effective researcher. An example is the fact that she took an unrequired geography class at [redacted] last semester in order to better understand Geographic Information Systems and place-based research.

The breadth and variety of Dr. [redacted]'s research are remarkable. She has worked with qualitative data, including focus group data from a Systematic Cultural Observation (SCO) project in [redacted]

[redacted], examining the link between nostalgia and limited physical activity in an impoverished population there. Her keen eye for sociological causes of health problems make her a unique team member and future research leader.

The project I have worked with her the most on is a secondary analysis of my [redacted] project (a cluster, randomized trial of obesity prevention). She designed a secondary analysis project, analyzed the data, and wrote an abstract that became a platform presentation at PAS and now a manuscript in progress—all in her first year of fellowship. Once again, Dr. [redacted] brought an environmental perspective to a health project. She looked at the ecological measure of commute time in the four sites of our trial and related them to key feeding and activity behaviors. This is an "out of the box" idea, and our [redacted] measures (designed before her involvement) do not answer her important question perfectly, but [redacted] has had good persistence with the project, demonstrating the "grit" that a lot of young investigators lack. Because of her study, presentation, and now draft of the manuscript, she has allowed me and the other PIs of the project to see the importance of commute time and the day to day struggles of families as influencing their dietary and physical activity patterns. I know that when she is designing her own studies, she will bring these insights to the table, allow them to be measured in rigorous ways, and influence important outcomes.

For this project, Dr. [redacted] strengthened connections to Dr. [redacted], a geographer who will be collaborating and Dr. [redacted], who has done prior work on the built environment and obesity and will lend her wisdom to the project. Dr. [redacted] has worked with epidemiologists and statisticians to develop the analytic plan and has explored the electronic data base capabilities to know that the data is geocoded. She has read voraciously to determine the best methods for the project and to build off of prior work while addressing important gaps. She will be able to use many of the rigorous methodological skills that she has developed for the proposed project. As part of her continued career development, she will attend didactics and seminars related to the work at hand and in preparation for her independent research.

Her research will have an important impact on child health. Prior work lacks the ability to look at change over time—to say nothing of the ability to take advantage of a natural experiment in [redacted]'s built environment. This grant will enable her to leverage this, contribute to the literature, and provide her valuable tools and data for an NIH K23 career development award planned for 2019.

I believe I am well-positioned to serve as an effective mentor for Dr. [redacted]. Many of my past mentees have gone on to successful careers as independently funded investigators in this field. I know—and love-- the APA Young Investigator Award mechanism, and I will be able to support Dr. [redacted] from this experience. I have an excellent working relationship with Dr. [redacted]. We meet on a weekly basis, email daily, and will continue to do so. I can commit to meeting with her for an hour every other week to ensure that this work is meeting our mutually-defined goals. I will be able to provide Dr. [redacted] basic guidance throughout data collection, analysis, presentation of findings, and, of course, publication.

I have expertise in childhood obesity prevention and early childhood physical activity behaviors, having focused my research career (K23 and two R01s) on childhood obesity. I have some experience in examining the built environment and assessing local culture and its relationships to

[redacted]

physical activity. Having been at [redacted] for 16 years and now [redacted] for nearly a year, I am well-versed in institutional resources and will help Dr. [redacted] access them. She will have mentors and co-investigators at both [redacted] and [redacted] in addition to help from [redacted], an outstanding investigator. I will connect her to multiple investigators at both institutions and nationally, help in her career development activities, and I am wholeheartedly committed to her success.

In short, I am excited that Dr. [redacted] is applying to the YIA program with this novel idea and that she is now competing in this final round. I wholeheartedly and enthusiastically support Dr. [redacted] application She is an extremely special post-doc and person. Her talents, experience, and innovative proposal are a wonderful match for this award. I have no doubt that this award will serve as a launching pad for the outstanding career she has ahead of her, and are fundamental to her planned independently funded K23 award. Should you have any questions about my support for Dr. [redacted], please do not hesitate to contact me.

Sincerely,

[redacted]

[redacted]

References

1. Ogden CL, Carroll MD, Fryar CD, Flegal KM. Prevalence of Obesity Among Adults and Youth: United States, 2011-2014. NCHS Data Brief. 2015(219):1-8.
2. Partnership for a Healthy Durham. Youth Risk Behavior Survey, Durham County Report 2015. Available at < http://healthydurham.org/cms/wp-content/uploads/2016/03/Durham-YRBS-2015-Report-FINAL_corrected-08052016.pdf>. Last accessed 12/21/17.
3. Boone-Heinonen J, Gordon-Larsen P. Obesogenic environments in youth: concepts and methods from a longitudinal national sample. Am J Prev Med. 2012;42(5):e37-46.
4. Baker JL, Olsen LW, Sorensen TI. Childhood body-mass index and the risk of coronary heart disease in adulthood. N Engl J Med. 2007;357(23):2329-2337.
5. Partnership for a Healthy Durham. Durham County, State of the County Health Report. 2012. Available at <http://healthydurham.org/cms/wp-content/uploads/2016/03/Durham-County-SOTCH-2012.pdf>. Last accessed 12/21/17.
6. Durham City-County Planning Department. Durham Trails and Greenways Master Plan. 2011. Available at <http://www.durhamnc.gov/agendas_new/2011/cm20111205/297659_8115_422602.docx.PDF>. Last accessed 12/21/17.
7. Partnership for a Healthy Durham, Obesity and Chronic Illness Committee. <http://healthydurham.org/committees/obesity-and-chronic-illness-committee/healthy-mile-trails>. Last accessed 12/21/17.
8. Willets S. Durham Adds Bike Lanes, Aims to Make City More Bike-Friendly. The Indy. March 29, 2017.
9. Dataworks NC, 2017. < https://sites.duke.edu/dataworksnc/>. Last accessed 12/21/17.
10. Sharifi M, Sequist TD, Rifas-Shiman SL, et al. The role of neighborhood characteristics and the built environment in understanding racial/ethnic disparities in childhood obesity. Prev Med. 2016;91:103-109.
11. Galvez MP, Pearl M, Yen IH. Childhood obesity and the built environment. Curr Opin Pediatr. 2010;22(2):202-207.
12. Veugelers P, Sithole F, Zhang S, Muhajarine N. Neighborhood characteristics in relation to diet, physical activity and overweight of Canadian children. Int J Pediatr Obes. 2008;3(3):152-159.
13. Oreskovic NM, Winickoff JP, Kuhlthau KA, Romm D, Perrin JM. Obesity and the built environment among Massachusetts children. Clin Pediatr (Phila). 2009;48(9):904-912.
14. Ding D, Sallis JF, Kerr J, Lee S, Rosenberg DE. Neighborhood environment and physical activity among youth a review. Am J Prev Med. 2011;41(4):442-455.
15. Seaman PJ, Jones R, Ellaway A. It's not just about the park, it's about integration too: why people choose to use or not use urban greenspaces. Int J Behav Nutr Phys Act. 2010;7:78.
16. Loukaitou-Sideris Ae. What Brings Children to the Park? Analysis and Measurement of the Variables Affecting Children's Use of Parks.
17. Day K. Active Living and Social Justice: Planning for Physical Activity in Low-income, Black and Latino Communities. Journal of the American Planning Association. 2006;72(1):88-99.
18. Perrin AJ, Caren N, Skinner AC, Odulana A, Perrin EM. The unbuilt environment: culture moderates the built environment for physical activity. BMC Public Health. 2016;16(1):1227.
19. Duncan DT, Castro MC, Gortmaker SL, Aldstadt J, Melly SJ, Bennett GG. Racial differences in the built environment--body mass index relationship? A geospatial analysis of adolescents in urban neighborhoods. Int J Health Geogr. 2012;11:11.

20. Lovasi GS, Neckerman KM, Quinn JW, Weiss CC, Rundle A. Effect of individual or neighborhood disadvantage on the association between neighborhood walkability and body mass index. Am J Public Health. 2009;99(2):279-284.
21. Fantin R, Delpierre C, Dimeglio C, et al. Disentangling the respective roles of the early environment and parental BMI on BMI change across childhood: A counterfactual analysis using the Millennium Cohort Study. Prev Med. 2016;89:146-153.
22. Tandon PS, Zhou C, Sallis JF, Cain KL, Frank LD, Saelens BE. Home environment relationships with children's physical activity, sedentary time, and screen time by socioeconomic status. Int J Behav Nutr Phys Act. 2012;9:88.
23. Carver A, Timperio A, Hesketh K, Crawford D. Are children and adolescents less active if parents restrict their physical activity and active transport due to perceived risk? Soc Sci Med. 2010;70(11):1799-1805.
24. Day K. Active Living and Social Justice: Planning for Physical Activity in Low-income, Black, and Latino Communities. Journal of the American Planning Association. 2006;72(1):88-99.
25. Showell NN, Cole KW, Johnson K, DeCamp LR, Bair-Merritt M, Thornton RLJ. Neighborhood and Parental Influences on Diet and Physical Activity Behaviors in Young Low-Income Pediatric Patients. Clin Pediatr (Phila). 2017;56(13):1235-1243.
26. Fiechtner L, Sharifi M, Sequist T, et al. Food environments and childhood weight status: effects of neighborhood median income. Child Obes. 2015;11(3):260-268.
27. Carroll-Scott A, Gilstad-Hayden K, Rosenthal L, et al. Disentangling neighborhood contextual associations with child body mass index, diet, and physical activity: the role of built, socioeconomic, and social environments. Soc Sci Med. 2013;95:106-114.
28. Bor J. Capitalizing on Natural Experiments to Improve Our Understanding of Population Health. Am J Public Health. 2016;106(8):1388-1389.
29. Jongeneel-Grimen B, Droomers M, van Oers HA, Stronks K, Kunst AE. The relationship between physical activity and the living environment: a multi-level analyses focusing on changes over time in environmental factors. Health Place. 2014;26:149-160.
30. Osypuk TL, Acevedo-Garcia D. Beyond individual neighborhoods: a geography of opportunity perspective for understanding racial/ethnic health disparities. Health Place. 2010;16(6):1113-1123.
31. Gordon-Larsen P, Nelson MC, Page P, Popkin BM. Inequality in the built environment underlies key health disparities in physical activity and obesity. Pediatrics. 2006;117(2):417-424.
32. Liao Y, Siegel PZ, Garraza LG, et al. Reduced Prevalence of Obesity in 14 Disadvantaged Black Communities in the United States: A Successful 4-Year Place-Based Participatory Intervention. Am J Public Health. 2016;106(8):1442-1448.
33. Fiechtner L, Cheng ER, Lopez G, Sharifi M, Taveras EM. Multilevel Correlates of Healthy BMI Maintenance and Return to a Healthy BMI among Children in Massachusetts. Child Obes. 2017;13(2):146-153.
34. Cole TJ, Faith MS, Pietrobelli A, Heo M. What is the best measure of adiposity change in growing children: BMI, BMI %, BMI z-score or BMI centile? Eur J Clin Nutr. 2005;59(3):419-425.
35. Frank LD, Schmid TL, Sallis JF, Chapman J, Saelens BE. Linking objectively measured physical activity with objectively measured urban form: findings from SMARTRAQ. Am J Prev Med. 2005;28(2 Suppl 2):117-125.
36. City of Durham, 2017. Resources available at <https://durhamnc.gov/684/MapsCity-Streets>. Last accessed 12/21/17.
37. Durham Parks and Recreation, City of Durham, 2017. Resources available at <https://durhamnc.gov/753/Parks-Recreation>. Last accessed 12/21/17.

38. Kaczynski AT, Koohsari MJ, Stanis SA, Bergstrom R, Sugiyama T. Association of street connectivity and road traffic speed with park usage and park-based physical activity. Am J Health Promot. 2014;28(3):197-203.
39. Duncan DT, Castro MC, Gortmaker SL, Aldstadt J, Melly SJ, Bennett GG. Racial differences in the built environment--body mass index relationship? A geospatial analysis of adolescents in urban neighborhoods. Int J Health Geogr. 2012;11:11.
40. Hirsch JA, Moore KA, Clarke PJ, et al. Changes in the built environment and changes in the amount of walking over time: longitudinal results from the multi-ethnic study of atherosclerosis. Am J Epidemiol. 2014;180(8):799-809.

Budget
Young Investigator Award
PI: [redacted] MD

Item	Detail	Amount requested from APA	Total Amount	Justification
Research Assistant	$20.38/hr (inc benefits/fringe) x 4hr/wk x 52wks	$4,240	$4,240	Assist with study execution, compliance, publication, publicity
[redacted] (Geographer and Social Epidemiologist)	($100/hr x 40hrs/year)	$4,000	$4,000	Study design consultation, geospatial and statistical analysis
PAS travel 3 days; 2 nights	Hotel=$400 ($200x 2 nights) Airfare = $450 Food=$180 ($60x3 days)	$1,030	$1,030	Hotel, airfare, meals
TOTAL	---	$9,270	$9,270	---