



# Momentum Center Impact Report



**THE FIRST FIVE YEARS**  
2013-2017

[momentumcenter.org](http://momentumcenter.org)

# ACKNOWLEDGEMENTS

The Momentum Center would like to acknowledge the funding, time and support provided by the University of Michigan Office of the Provost and the School of Public Health Dean's Office. Specific appreciation goes to Dr. Alfred Franzblau, former Associate Dean for Research at the School of Public Health and Vice Provost for Academic and Budgetary Affairs for the University; Dr. John Meeker, current Senior Associate Dean for Research at the School of Public Health; and Dr. Sharon Kardia, Senior Associate Dean for Administration at the School of Public Health.

The Momentum Center also acknowledges the guidance, support and inspiration provided by consultants Val Williams, Bert Scott, Jim Rae, Jeff DeGraff, Richard Olson and Ethan Eagle.

Finally, the Momentum Center expresses gratitude for the important contributions made by inaugural Executive Director, Tania Piotrowski, and project coordinator, Lisa Marchlewicz.

## Internal Advisory Board

The Momentum Center has also received invaluable guidance from an Internal Advisory Board, with contributions from:

### **Lori Bestervelt, PhD**

*Executive Vice President and Chief Technical Officer, NSF International*

### **Charles Burant, MD, PhD**

*Director, A. Alfred Taubman Medical Research Institute*

*Professor of Internal Medicine*

### **Matthew M. Davis, MD**

*Chief of Academic General Pediatrics and Primary Care in the Department of Pediatrics, Northwestern Medicine*

*Former Professor of Pediatrics and Communicable Diseases, University of Michigan Health System*

### **Alfred Franzblau, MD**

*Professor of Environmental Health Sciences*

*Former Associate Dean for Research at the School of Public Health and Vice Provost for Academic and Budgetary Affairs for the University*

### **Phyllis E. Meadows, PhD**

*Senior Fellow in the Health Program, The Kresge Foundation*

*Former Associate Director, Office of Public Health Practice, School of Public Health*

### **Ron Zernicke, PhD**

*Professor of Kinesiology*

*Former Dean, School of Kinesiology*

# CHILDHOOD OBESITY IN THE U.S.



## CHILDREN AFFECTED

Obesity affects 17% of U.S. children aged 2 to 19 years old.



## RACE AND ETHNICITY



The rates of obesity are higher in certain racial and ethnic groups.

## FACTORS

While diet and limited physical activity are clear contributors to obesity, other factors such as genetics and environmental toxicants may play a role.



## INTERVENTION

Obesity interventions may have greater impact during critical periods of childhood (from womb to early infancy, from preschool to school-age, and into adolescence).



MomentumCenter   
Driving discovery to end childhood obesity

Visit [www.momentumcenter.org](http://www.momentumcenter.org)

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NIEHS/EPA Children's Environmental Health and Disease Prevention Research Centers Impact Report: Protecting Children's Health Where They Live, Learn, and Play (Rep.). (2017). Retrieved from [https://www.epa.gov/sites/production/files/2017-10/documents/niehs\\_epa\\_childrens\\_centers\\_impact\\_report\\_2017\\_0.pdf](https://www.epa.gov/sites/production/files/2017-10/documents/niehs_epa_childrens_centers_impact_report_2017_0.pdf)  
Blake-Lamb, T. L., Locks, L. M., Perkins, M. E., Baidal, J. A., Cheng, E. R., & Taveras, E. M. (2016). Interventions for Childhood Obesity in the First 1,000 Days A Systematic Review. American Journal of Preventive Medicine, 50(6), 780-789. doi:10.1016/j.amepre.2015.11.010

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## MESSAGE FROM THE DIRECTORS

Childhood obesity has been and continues to be a serious problem in the United States and across the globe. In 2013, the University of Michigan (U-M) School of Public Health launched the Momentum Center as a University-wide research center focused on the prevention of childhood obesity. Believing that every child deserves an environment conducive to healthy behaviors, growth and development and recognizing the breadth and depth of expertise at the University, we brought together a broad group of experts from varied disciplines to create original and effective approaches to tackling childhood obesity.

This impact report highlights some of the progress the Momentum Center has made in the 5 years since inception. We are proud of what we have achieved and are thankful for the investment in and support of the Momentum Center by both the Office of the Provost and the School of Public Health. We are also grateful for our many partners across campus who have come together and invested their time, talents and energy to create such a vibrant scientific community.

The Momentum Center convenes faculty from **12** schools/units across the University of Michigan and to date, through its Research Development Program, has funded **2** multi-collaborative projects, **9** pilot and feasibility projects, and **12** student summer internship research projects.

As a result of fostering cross-disciplinary interchange, novel partnerships and compelling new research directions:

- 15 grants totaling over \$1.1 million have been awarded from both internal and external entities, including:
  - 7 external grants totaling nearly \$800,000
  - 8 U-M grants leveraging over \$365,000 in internal funding
- 16 Momentum Center studies have been published, with several more currently under review;
- Many products have been developed, including prototypes for systems to increase physical activity in the classroom; instruments to assess healthfulness of both meals served at family meal times and of child care menus; and a common catalog of data sets for obesity research;
- Numerous presentations have shared project findings with audiences such as physicians, architects, and health educators from as near as Ann Arbor, Michigan and as far as Reykjavik, Iceland.

Through the Momentum Center, investigators from disciplines that have not traditionally collaborated are now interfacing, identifying synergies, and thinking creatively about a broad public health challenge. As we celebrate the progress that has been made in the last 5 years, we also look forward to the future where we will both create and embrace opportunities to further drive discovery to end childhood obesity.

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*Yours in good health,*



**Karen Peterson, ScD**

Director, Momentum Center

Professor and Chair, Department of  
Nutritional Sciences

Professor of Global Public Health

University of Michigan School of Public  
Health



**Julie Lumeng, MD**

Associate Director,  
Momentum Center

Professor of Pediatrics and  
Communicable Diseases

Research Professor, Center for  
Human Growth and Development

Professor, Nutritional Sciences



**Lindsey Mitchell, MPH**

Executive Director,  
Momentum Center

## CENTER LEADERSHIP

In addition to Drs. Peterson and Lumeng, and Ms. Mitchell, the Momentum Center is guided by an engaged steering committee of cross-disciplinary faculty leaders. This committee provides counsel regarding the Center's strategic directions and priorities, as well as operations.

### Steering Committee Members



**Jeffrey Horowitz, PhD**

*Professor of Movement Science*

Interests: Regulation of fat and carbohydrate metabolism and oxidation and how exercise influences this regulation



**Joyce Lee, MD, MPH**

*Robert P Kelch M D Research Professor of Pediatrics*

Interests: obesity; diabetes; social media; mobile health



**Alison Miller, PhD**

*Associate Professor, Health Behavior and Health Education*

Interests: Child development; stress; self-regulation; obesity



**Edward Norton, PhD**

*Professor of Health Management and Policy, Professor of Economics*

Interests: Health economics; long-term care, aging; econometrics



**Kenneth Resnicow, PhD**

*Professor of Health Behavior and Health Education*

Interests: Design and evaluation of health promotion programs for special populations; relationship between ethnicity and health behaviors; school-based health promotion; substance use prevention; motivational interviewing for chronic disease prevention



**Darleen Sandoval, PhD**

*Associate Professor of Surgery, Associate Professor of Nutritional Sciences*

Interests: Brain and gut communication to regulate glucose and lipid metabolism



**Peter Song, PhD**

*Professor of Biostatistics*

Interests: Longitudinal data analysis; missing data problems in clinical trials; statistical methods in bioinformatics and genetics; time series analysis



**Susan Woolford, MD, MPH**

*Assistant Professor of Pediatrics*

Interests: Child obesity; physician-family communication using mobile technologies

## Honorable Mention



**Milton Curry**, formerly a Professor and Senior Dean of Architecture and Urban Planning at the U-M served on the steering committee from the Center's inception until July 2017, when he became the Dean at the University of Southern California School of Architecture. His willingness to engage with health sciences faculty and share his design perspective was instrumental to the foundation and progress of the Center.

# APPROACHING THE CHALLENGE OF STUDYING CHILDHOOD OBESITY WITH A UNIQUE PERSPECTIVE



## The Need

Childhood obesity is a serious problem in the United States. Despite recent reports that show declines among preschool-aged children, the prevalence of children with obesity is still too high and disparities persist by race, ethnicity and socioeconomic status . In fact, a simulation of growth trajectories of childhood obesity into adulthood predict that a majority of today's children (57%) will have obesity at the age of 35.

Widespread efforts to test childhood obesity interventions are ongoing but little is known about the long-term success of changes in behavior, weight status and reduction of chronic disease development in childhood and later life. The magnitude of childhood obesity and its health and social consequences demand that researchers develop more effective approaches to prevention and management.

## The Vision: Driving Discovery to End Childhood Obesity

Recognizing that many factors contribute to obesity trends, the University of Michigan School of Public Health initiated the Momentum Center in 2013 to converge experts from varied disciplines to develop original, effective solutions to reduce, prevent and ultimately end childhood obesity.

The mission of the University of Michigan Momentum Center is to advance solutions to prevent and manage childhood obesity by catalyzing, innovating and translating cross-disciplinary research.

## The Momentum Center accomplishes its mission by:

- Fostering a diverse base of investigators;
- Providing infrastructure to stimulate and support innovative childhood obesity research;
- Training the next generation of childhood obesity researchers;
- Translating and sharing findings; and
- Considering how sensitive periods in child development influence obesity.

<sup>1</sup>"Childhood Obesity Facts." Centers for Disease Control and Prevention, 10 Apr. 2017, [www.cdc.gov/obesity/data/childhood.html](http://www.cdc.gov/obesity/data/childhood.html)

<sup>2</sup>Ward ZJ, Long MW, Resch SC, Giles CM, Craddock AL, Gortmaker SL. Simulation of Growth Trajectories of Childhood Obesity into Adulthood. *N Engl J Med* 2017; 377:215-2153.

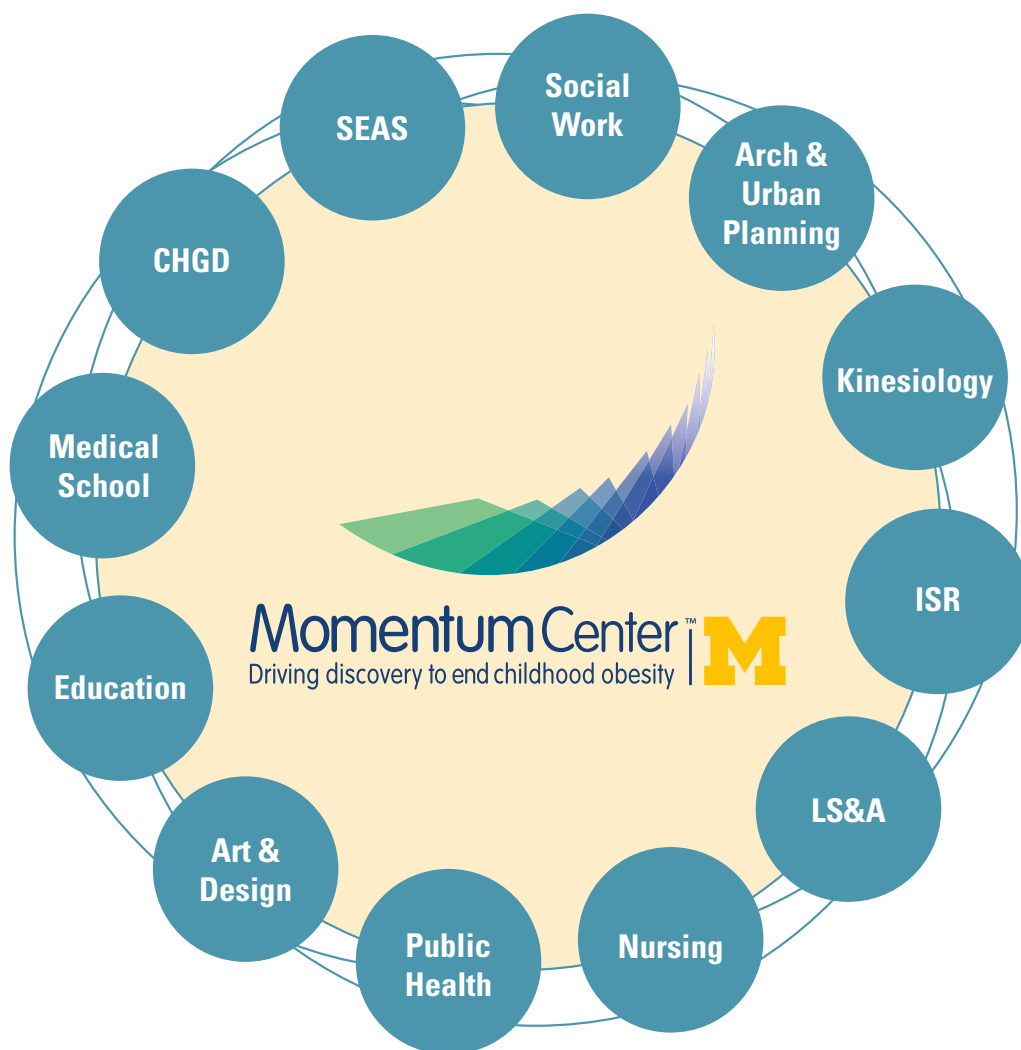


# FOSTERING A DIVERSE BASE OF INVESTIGATORS ACROSS THE UNIVERSITY

The Momentum Center has since built a scientific community of investigators who seek engagement across disciplines and opportunities to spark new ideas that will prevent or reduce childhood obesity.

**As of December 2017, Momentum Center members hail from 12 schools/units.**

Their expertise spans basic, clinical and behavioral research and their areas of interest range from epigenetics to the built environment. For a list of members and expertise, please visit [momentumcenter.org/members](http://momentumcenter.org/members)



## Abbreviations

**SEAS** = School for Environment and Sustainability

**LS&A** = College of Literature, Science, and the Arts

**CHGD** = Center for Human Growth and Development

**ISR** = Institute for Social Research



# STIMULATING AND SUPPORTING CROSS-DISCIPLINARY CHILDHOOD OBESITY RESEARCH

The Momentum Center provides resources, incentives and opportunities to innovate and co-create scientifically novel childhood obesity solutions. This is done through a multi-level Research Development Program that includes:

- Two major multi-collaborative projects that were created to stimulate the cross-disciplinary innovation process;
- Pilot and feasibility seed grants to cross-disciplinary teams that include at least one Momentum Center member;
- Summer student research internship funding to work with Momentum Center investigators;
- Grant-writing workshops for post-doctoral fellows and faculty.

To date, the Momentum Center has funded:



Multi-collaborative projects



Pilot and feasibility projects



Student summer internship research projects

In addition, the Momentum Center supports this research by:

- Hosting bi-monthly forums for members to learn about new findings and engage in discourse related to childhood obesity research, and generate new research ideas and partnerships;
- Providing core resources for data access and analysis as well as nutrition and physical activity assessment;
- Sending a monthly member newsletter with a member spotlight and announcements about childhood obesity funding, training, events, member publications and news;
- Organizing events, symposiums and lectures related to childhood obesity;
- Coordinating trainings for faculty, staff and/or students that help further their research;
- Creating informal opportunities for members to interact and network.



*"Cross-disciplinary research is essential for making progress in combating a problem as complicated as obesity."*

- **Ashley Gearhardt, PhD**, Assistant Professor, Psychology

# MULTI-COLLABORATIVE PROJECT: ACTIVE CLASS SPACE

## Project Summary

### Active Class Space Phase I

This project brought together researchers from Architecture, Kinesiology, Education and Public Health to re-imagine the elementary classroom space as a place that will be more conducive to increasing physical activity.

This work entailed:

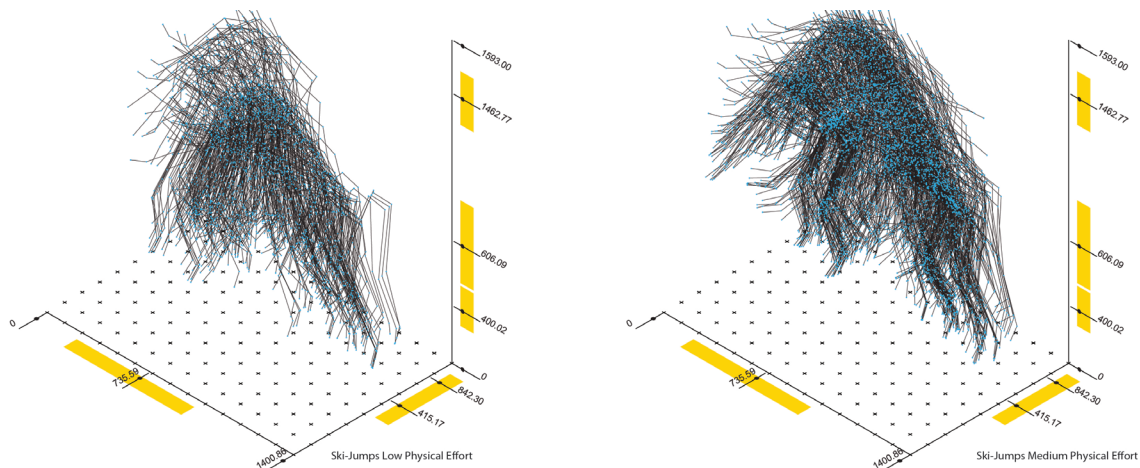
- A metabolic benefits laboratory study to examine the influence of intermittent physical activity breaks of various intensities on physical activity energy expenditure, dietary intake, blood

pressure responses, psychological mood and math performance in thirty-nine elementary-age school children (18 males, 21 females; ages 7-11 years; 33% overweight/obese; 59% non-white) (PI: Hasson); and

- A study of digital simulation methods compatible with architectural tool-sets in determining the appropriate amount of space needed to participate in planned classroom physical activities and the constructed development of wall equipment and/or furnishings as stand-alone devices for stimulating movement (PI: Vance).



Children, Dr. Rebecca Hasson, and research staff get active during the metabolic lab study.



Digital simulation methods using motion articulate physical activities.

## Active Class Space Phase II

The second phase of this project, currently underway, includes the:

1. Creation and pilot testing of the Interrupting Prolonged Sitting with Activity (InPACT) study and
2. Refinement of classroom floor plan guidelines as well as the Playblok.

*"Kids are enjoying them and getting accustomed to them in our routine and understanding how to focus afterward."*  
- teacher implementing InPACT

### The Interrupting Prolonged Sitting with Activity (InPACT) study

Preliminary evidence from the Active Class Space Phase I metabolic laboratory study was used to develop InPACT, a novel classroom-based physical activity intervention to improve the fitness of both teachers and students, while simultaneously improving academic achievement. The project team also expanded to include the School of Education's Center for Education Design, Evaluation and Research (CEDER) and the Project Healthy Schools program. The goal of InPACT is to provide teachers with the necessary resources and instruction to lead their classes in 10, 3-minute moderate-to-vigorous physical activity breaks throughout the school day. InPACT was piloted in three Southeastern Michigan elementary schools (20 teachers, 500 students) in the 2016-2017 school year.

### Classroom floor plan guidelines and Playblok

The architectural design research initiated in Active Class Space (Phase I) investigated the means of documenting the spatial affordances of select physical activities using architectural tool-sets, and the correlating constructed properties of a stand-alone wall system intent on stimulating physical movement through play based on those movements.

This work was used in Phase II as the basis for planning, programming, and visualizing spatial connectivity in developing a speculative school

scenario wherein the goal of providing adequate space for associated physical activities would be adjacent to learning activities.

The first half of the project included:

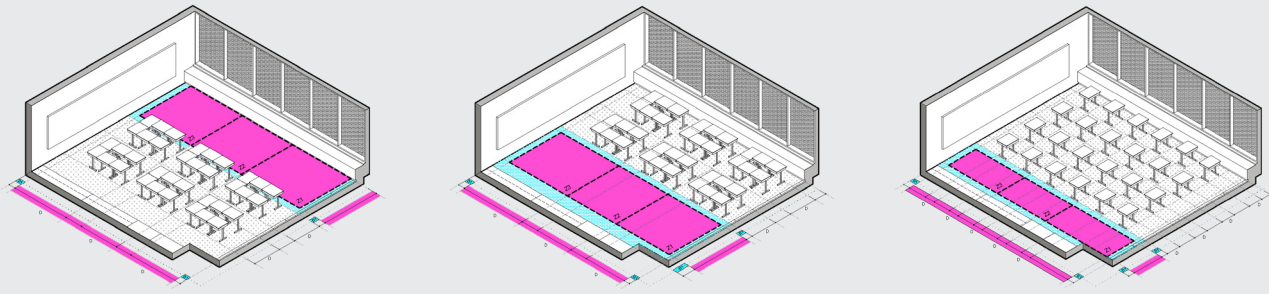
1. Determining possible modifications to classroom furnishing arrangements when optimizing clear floor space to be used for the InPACT classroom physical activity breaks;
2. Visualization aides for teacher training in the form of pilot video production and poster design;
3. Design investigations of classroom and hallway configurations for linear and static physical activities; and
4. Speculative research into the assembly of class space activities into a single school facility, collectively investigating the associations and consequential impacts on configuration, furnishing and equipment, and curricular requirements.

A total of nine classroom floor-plan configurations were developed for use in the InPACT Teacher Training materials, taking into account the area of movement associated with early adolescent bodies during the proposed activities, and the space that would need to be allocated for individual and zoned group physical activities. Refinements to the configurations are based on observations learned through participation in the InPACT meetings and discussions afforded by the joint activities. Participating teachers also received consultation regarding plausible room configurations for their specific classroom that would accommodate the physical activities while also upholding teacher preferences for the classroom's orientation and management of behavioral issues.



PLA-Blok (Playblok) prototype wall condition





Three of the nine sample floor plan configurations that were used in teacher consultations

The second half of the Phase II activities included:

1. Development of the stand-alone wall system into smaller systems,
2. Visual documentation of the prototype development, and
3. Product brand development of “Playblok” pending successful implementation.

Prototypes based on the initial stand-alone wall have been developed as kiosk and table-like structures, and the conceptual body for a portable version has been 3-D printed. Work scheduled for the final phase includes:

1. Prototyping of the interlocking parts that make the portable version assembly;
2. Hiring of a computer science assistant to aid in the programming of the gaming interface;
3. Wiring and production on the portable version; and
4. Product testing.

## Results

### What we’ve learned

#### Classroom Physical Activity Breaks

Our findings from the laboratory demonstrated that

when 8 hours of prolonged sitting were interrupted with high-intensity activity breaks, children maintained their habitual physical activity levels away from the laboratory, increasing total daily physical activity energy expenditure by an additional 150 calories without any changes in their food intake. Children reported higher enjoyment after completing the activity breaks compared to sedentary screen time breaks, with mood improving throughout the day in overweight/obese children during the high-intensity breaks. In addition, high-intensity activity breaks elicited the same level of math performance compared to cognitively stimulating computer game breaks. These findings demonstrated that moderate-to-vigorous intensity intermittent activity breaks may be an effective strategy to increase metabolic, psychological, and cognitive outcomes in children. Our findings from the classroom demonstrate that teachers could feasibly implement 4-6 activity breaks per day, thereby accumulating an additional 75-100 minutes of moderate-to-vigorous physical activity in the classroom per week.

In addition, the InPACT study found that:

- Approximately 70% of the teachers are continuing to implement the physical activity breaks in their classrooms.



*“In contrast to traditional silo-based research, we created a research and training environment that encouraged cross-disciplinary information exchange to address the issue of physical activity disparities from multiple perspectives. Together, we were able to frame better research questions, integrate relevant evidence and advance translational knowledge, thereby giving us the necessary tools to optimize the delivery of health-enhancing physical activity across multiple levels of the social-ecological model.”*

**- Rebecca Hasson, PhD, Assistant Professor, Kinesiology**

- Approximately 85% of students' activity breaks were completed at a moderate-to-vigorous intensity.
- Children reported an 8 out of 10 on their confidence to complete 30 minutes of moderate-to-vigorous physical activity every day at school.
- Children reported a 4.2 out of 5 on a physical activity enjoyment scale.
- Average transition time from sitting to the initiation of an activity break was 1 minute (with reported transition time being as low as 2 seconds).
- Over 99% of children were on-task (doing what their teacher instructed) within 30 seconds of completing an activity break.

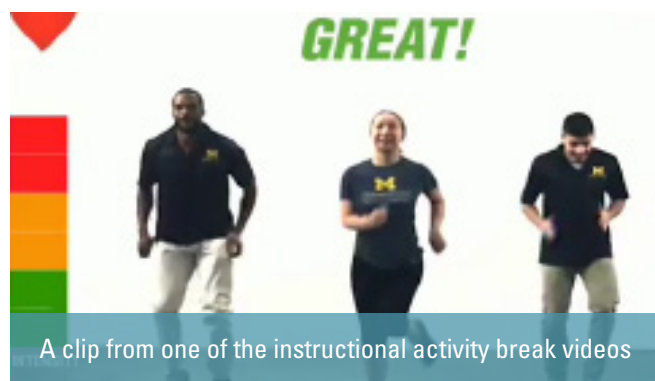


Students get active during an InPACT break

These findings suggest that InPACT represents an enjoyable, health-enhancing, low-cost strategy to reduce prolonged sitting time while simultaneously increasing structured physical activity opportunities and improving on-task behaviors in the classroom.

### Classroom Design

While the intent of this project was not to define architectural standards or guidelines for educational settings, this research does provide additional evidence regarding the benefit of using the built environment to address sedentary behaviors. The documentation of the classroom configurations and modifications will be used to inform the validity of the furnishing arrangements and physical activity zones in the proposition of future guidelines, and contribute to speculative design studies of prototypical educational institutions.



A clip from one of the instructional activity break videos

### Products

1. Development of the Playblok, both as a handheld device and as a wall covering.
2. Creation of a teacher training manual and a compendium of physical activities for the classroom.
3. Development of classroom floor plan guidelines for the configuration of classrooms to allow for adequate space for physical activity.
4. Design and three-dimensional printing of parts and fabrication of display items for architectural workshops.
5. Production of a series of instructional videos for teachers to use to guide activity breaks. These videos were shot in the Taubman College of Architecture and Urban Planning and involved students from both Kinesiology and Architecture.
6. Creation of motivational and heart rate classroom posters.

### Publications

1. Block SS, Tooley TR, Nagy MR, O'Sullivan MP, Robinson LE, Colabianchi N, Hasson RE. Acute effect of intermittent exercise and action-based videogame breaks on math performance in preadolescent children. *Ped. Exerc. Sci.* 2017. In press.
2. Ajibewaa TA, O'Sullivan MP, Nagy MR, Block SS, Tooley TR, Robinson LE, Colabianchi N, Hasson RE. The effects of interrupting prolonged sitting with intermittent activity on appetite sensations and subsequent food intake in preadolescent children. *PLOS ONE*. 2017. In press.



3. O'Sullivan MP, Nagy MR, Block SS, Tooley TR, Robinson LE, Colabianchi N, Hasson RE. Acute compensatory responses to interrupting prolonged sitting with intermittent activity in preadolescent children. *Ped. Exerc. Sci.* June 2017;12:1-21. [Epub ahead of print].
4. Vance US, Hasson RE, Ransier B, Stockdill D. Move Detroit: An Active Class Space Intervention. 105th Association of Collegiate Schools of Architecture Annual Meeting and Technology Conference Proceedings. March 2017.
5. Nagy MR, O'Sullivan MP, Block SS, Tooley TR, Robinson LE, Colabianchi N, Hasson RE. Affective Responses to Intermittent Physical Activity in Healthy Weight and Overweight/Obese Elementary School-Age Children. *J Phys Act Health.* 2017;6:1-24.



Kinesiology and Architecture students work together to create the activity break videos

### Presentations

1. Vance US. DesignMarch Conference. March 2017. Reykjavik, Iceland.
2. Hasson RE. "Every Kid Counts: School-based strategies to reducing inequities in physical activity participation." U-M Center for Exercise Research Seminar. April 2017. Ann Arbor, MI.
3. Hasson RE. "Interrupting Prolonged Sitting with Activity (INPACT): a classroom-based physical activity intervention." 2017 Connecting with Kids Through School Health Conference. June 2017. Boyne Falls, MI
4. Vance US. "Free Range Formal Paths: The role of architecture in shaping the built environment for PA." Active Living Research Conference. February 2017. Clearwater Beach, FL. Discussion facilitator.
5. Hasson RE, Ransier B, Vance US, Stockdill D, Colabianchi N, Abijewa T, Beemer L, O'Sullivan MP. "Feasibility of interrupting prolonged sitting with activity to enhance movement and learning in the classroom: preliminary results from the InPACT project." Active Living Research Conference.

February 2017. Clearwater Beach, FL.

6. Vance US, Curry MSF, Hasson RE, Ransier B, Stockhill D, Locke C, Tran YN, Maj C, Ai M. "Active class space: preliminary studies of classroom affordances for in-class physical activity breaks." Active Living Research Conference. February 2017. Clearwater Beach, FL.
7. Vance, Hernandez, Tabor, Donaldson, Minton. "Acts of Spatializing Healthy: Adolescent Bodies in Motion." Arab Society of Computer-Aided Architectural Design (ASCAAD). November 2016. London, UK.
8. Hasson RE. "Interrupting prolonged sitting with activity (InPACT): a classroom-based physical activity program." Society of Health and Physical Educators Michigan 120th Annual Convention. October 2016. Mackinac Island, MI.

### Leveraged Internal Funding

1. U-M School of Kinesiology Pilot Research Fund, "Classroom-Based Strategies to Reduce Physical Activity Disparities Among Ethnic Minority Children with Asthma" (PI: Hasson)
2. MCubed, "Active Classroom" (PI: Curry)
3. Taubman College of Architecture and Urban Planning Research Through Making Grant, "Drop Kick Push Pull" (PI: Vance)

### Opportunities for Training

This project has provided ample opportunities for University of Michigan students to engage in interprofessional education and has helped shape their professional trajectories. For example, the project provided one Architecture student with their first job experience, one with the ability to pursue an alternate career path, and two others the opportunity to gain experience in the management of field specific interest in architecture.



A mix of faculty, staff and students meet to discuss the InPACT project

# MULTI-COLLABORATIVE PROJECT: HEALTHY FAMILIES

## Project Summary

This project integrates the perspectives of 10 researchers representing Medicine, Kinesiology, Nursing, Public Health, Communications Studies, and Psychology. It explores multiple aspects of a child's biology, diet, physical activity, environment and family relationships in order to develop a phenotype of children according to the strength of their observable satiety cues. This phenotype will support the development of tailored interventions that can help parents better guide their children through healthy growth and development.

The study enrolled 40 families with a child 12.0-24.0 months old ("toddler age"), 40 families with a child 3.0 - 5.99 years old ("preschool age"), and 52 families with a child 10.0 - 12.99 years old ("school age") and included:

- Structured interviews
- Language ENvironment Analysis System (LENA) audio recording
- Use of actigraphy equipment to collect data regarding daily physical activity of the child and parent
- Collection of saliva for epigenetic and fatty acid analyses
- Epigenetic analysis of neonatal blood spots obtained from the Michigan Neonatal Biobank in order to assess the impact of environment, nutrition, and behaviors on epigenetic expression over time.

## Results

### What we've learned

Given that this project included measures from a wide variety of perspectives and interests, what we have learned spans many fields.

- **Family food talk**

One arm of the Healthy Families Project assessed how parents and children talk about food outside of mealtimes in relation to parent-reported feeding practices, parent-reported child eating behaviors, and child weight. An enhanced digital recording approach (the Language ENvironment Analysis System; LENA Research Foundation, Boulder, CO) was used to characterize food talk outside of mealtime as it occurred in naturalistic home settings. It found that child and mother food talk were positively associated with greater



A Language ENvironment Analysis System (LENA) audio recorder

endorsement of feeding and child eating behaviors known to associate with child overweight/obesity. Observing naturalistic conversations about food can inform our understanding of parent-child interactions around food and may lead to better nutrition-focused interventions that seek to reduce feeding and eating outside of meals.

- **Physical activity**

Two different projects examined questions related to physical activity.

One project explored if there were associations between mother's and children's physical activity patterns. Moderate-to-vigorous physical activity (MVPA) and sedentary time (ST) data were collected using accelerometers over a seven consecutive day period. When controlling for child and parent characteristics and setting variables (e.g., home vs. outside of home, weekday vs. weekend), mother-child ST and MVPA levels were positively associated. Further, the association of mother-child ST and MVPA levels differed by settings. These results support the rationale for developing a family-centered intervention that takes place in the home to increase PA and decrease ST.

The other project sought to determine the minimal number of days and hours of accelerometry needed to reliably measure daily physical activity in infants using Generalizability (G) theory. To do this, infants wore an accelerometer on the right ankle and right wrist for 7 days and then the accelerometry data were cleaned to exclude activity counts not produced by the infant. After then applying G theory analyses, some of the first guidelines for objective

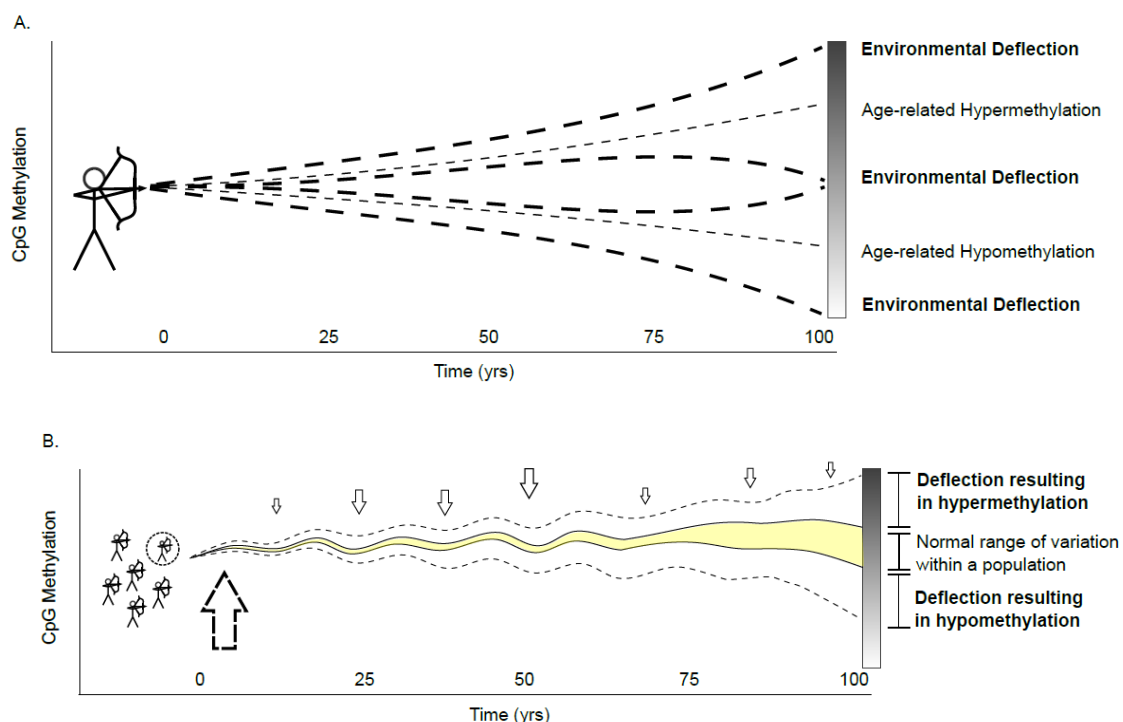
physical activity measurement during infancy were produced. It was determined that monitoring periods of at least 3 days including all daytime hours appear to be sufficient for reliable measurement.

- **Study compensation**

Another arm of this study looked at how compensation impacts participation in studies involving the collection of blood from children for research purposes. Children were randomized to one of three compensation levels to determine what is an adequate/acceptable compensation amount. For the overall sample, it was found that higher compensation had a significant positive effect on the willingness to provide a blood sample. With a goal to provide as much practical guidance as possible to future researchers, this study determined that the elasticity of the willingness to provide a blood sample was .33 and that raising the compensation by US\$1 increased the probability of a respondent agreeing to provide a blood sample by 0.5 percentage point.

- **Epigenetics**

The Healthy Families Project also investigated whether age-related DNA methylation (DNAm) is occurring at genes related to growth, development, and energy homeostasis – PPARA, LEP, ESR1, SREBF1, H19, IGF2, and LINE-1 – during the early stages of human life. Longitudinal DNAm was measured in matched neonatal bloodspots and childhood blood samples using quantitative DNA pyrosequencing. Across childhood age groups in matched blood samples, DNAm levels in blood significantly decreased with age ( $p < 0.05$ ) at LINE-1, PPARA, ESR1, SREBF1, IGF2, and H19, and significantly increased with age ( $p < 0.05$ ) at LEP. These results suggest that age-related methylation occurs at growth-related genes in the first decade of life, and that longitudinal DNAm patterns may play a regulatory role in childhood obesity development.



#### Environmental deflection of the aging epigenome.

**Figure A)** For any individual, DNA methylation levels change during normal aging. Complicating this predictable process, an individual's personal environment can alter the rate of epigenetic changes that occur with age. We have termed this phenomenon "environmental deflection," and represent it using the altered flight path of an arrow fired at a target.

**Figure B)** On the population level, the variability of DNA methylation also changes during normal aging. This random process is called epigenetic drift. Here, the yellow shaded area is the normal range of DNA methylation for the population. Based on the population's environmental exposures (vertical dotted arrows), epigenetic drift can be deflected outside the normal range, depicted by the dotted line.





*"As an economist, I enjoy working with researchers from other disciplines because we all bring different perspectives to the table."*

- **Edward Norton, PhD**, Professor, Health Management and Policy; Economics

## Publications

1. Song M, Dieckmann NF, Stoyles S, Kim Y, Lumeng JC. Associations between mother's and children's moderate-to-vigorous physical activity and sedentary time in the family context. *Preventive Medicine Reports*. 2017 December; 8,197-203.
2. Schulte EM, Jacques-Tiura AJ, Gearhardt AN, King S. Food addiction prevalence and concurrent validity in African American adolescents with obesity. *Psychology of Addictive Behaviors*. In press.
3. Ketcheson L, Pitchford EA, Kwon HJ, Ulrich DA. Physical Activity Patterns in Infants With and Without Down Syndrome. *Pediatr Phys Ther*. 2017 July; 29(3):200-206.
4. Pitchford AE, Ketcheson LR, Kwon HJ, Ulrich DA. Minimum Accelerometer Wear Time in Infants: A Generalizability Study. *J Phys Act Health*. 2017 June; 14(6): 421-428.
5. Roach E, Viechnicki GB, Retzliff LB, Davis-Kean P, Lumeng JC, Miller AL. Family food talk, child eating behavior, and maternal feeding practices. *Appetite*. 2017. 117:40-50.
6. Richmond RL, Roberto CA, Gearhardt AN. The association of addictive-like eating with food intake in children. *Appetite*. 2017. 117, 82-90.
7. Acharya Y, Norton EC, Lumeng JC. The Effect of Financial Compensation on Willingness to Supply a Child's Blood Sample: A Randomized Controlled Trial. *Evaluation & the Health Professions*. 2017; (40), 3: 359-371.
8. Miller AL, Ellis A, Domoff SE. "Food Talk in Families." *Socializing Children Through Language*. Ed. Pamela Davis-Kean, Ed. Sandra Tang. Academic Press, 2016. 147-176.

## Externally Funded Grants

1. NIH R03, "Family Food Talk and Obesity Risk in Toddlers, Preschoolers and Preteens" (PI: Miller)

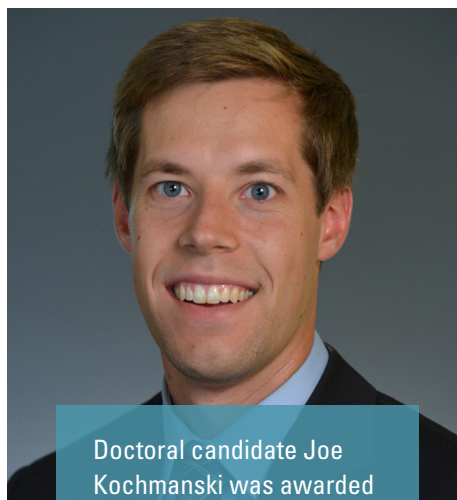
## Leveraged Internal Funding

1. MCubed, "Maternal Feeding Project: Team 1" (PI: Miller)
2. MCubed, "Maternal Feeding Project: Team 2" (PI: Dolinoy)
3. MCubed, "Maternal Feeding Project: Team 1" (PI: Gearhardt)
4. MICHR Post-doctoral Translational Scholar Program, "Early-life lead (Pb) exposure and epigenomics as biomarkers of childhood obesity risk" (Post-doctoral fellow: Montrose)

## Presentations

1. Kochmanski J. "Neonatal DNA Methylation Patterns are Associated with Childhood Weight Status in the Healthy Families Project." University of Michigan Developmental Origins of Metabolic Syndrome Symposium. October 2017. Ann Arbor, MI.
2. Gearhardt AN. "Food Addiction: A Controversial Construct." Presentation given at the International Conference for Eating Disorders. June 2017. Prague, Czech Republic.
3. Song M, Dieckmann NF, Stoyles S, Lumeng JC. "Associations between mother's and children's moderate-to-vigorous activity and sedentary time in the family context." American College of Sports Medicine 64th Annual Meeting. May 2017. Denver, CO.
4. Dolinoy DC. "Mechanistic Insights into Epigenetic Regulation of Toxicity and Implications for Risk Assessment." The American Society for Pharmacology and Experimental Therapeutics meeting at Experimental Biology. Invited speaker and symposium co-chair. April 2017. Chicago, IL.
5. Riley HO, Lee Y, Domoff SE, Radesky J, Miller AL. "Parent-Child Interactions Around Media Use Before Bedtime." Midwestern Psychological Association Annual Convention. April 2017. Chicago, IL.

6. Gearhardt AN. "An examination of the validity of "food addiction." Presentation given at the University of Michigan Medical School Grand Rounds. April 2017. Ann Arbor, MI.
7. Gearhardt AN. "An examination of the validity of "food addiction." Keynote Address given at the Midwestern Psychological Association Annual Conference. April 2017. Chicago, IL.
8. Domoff SE, Radesky J, Harrison K, Lumeng JC, Miller AL. "How are Digital Media Used and Mediated in the Home? A Mixed-methods Observational Study of Toddlers and Preschool Children." Symposium conducted at the Society for Research on Child Development Special Topic Meeting: Technology and Media in Children's Development. October 2016. Irvine, CA.
9. Gearhardt AN. "Evidence for Food Addiction." Keynote presentation given at the 2016 SSEW Symposium at University of California San Francisco. October 2016. San Francisco, CA.
10. Ulrich DA. "Physical activity in toddlers: How many days and hours of accelerometer measurement do we need?" North American Society for the Psychology of Sport and Physical Activity Conference. June 2016. Montreal, Canada.
11. Smith K, Heshmati M, Akatue S, Domoff SE, Lumeng JC, Miller AL. "Parent-Child Interactions during Toddlers' Screen Media Use are Uncommon: Results from a Naturalistic Observational Study." Association for Psychological Science Annual Convention. May 2016. Chicago, IL.
12. Ellis A, Miller AL, Domoff S. "Food Talk in Families." In (Tang/Davis-Ken, Chairs): "Parenting through Conversations: Using Audio Recordings in the Home to Understand Mothers' Socialization of their Preschool-Aged Children." Association of Psychological Sciences Meeting. May 2016. Chicago, IL.



Doctoral candidate Joe Kochmanski was awarded Momentum Center student internship funding to study epigenetics in the Healthy Families cohort.

## Opportunities for Training

This project has provided unique research training both to undergraduate and graduate students. For example, three Undergraduate Research Opportunity (UROP) students received UROP funding to travel to the Association for Psychological Sciences Annual Convention to present their research poster. In addition, two pre-doctoral students have received Momentum Center summer internship funding to work on projects with these data, with one student analyzing the correlations between cheek cell fatty acids and dietary fatty acid intake and the other investigating epigenetic mechanisms associated with child obesity by quantifying levels of DNA methylation in a targeted gene analysis. A post-doctoral fellow is also utilizing the Healthy Families Project as a training vehicle to learn skills in environmental epidemiology and analysis of big data involving genetics.

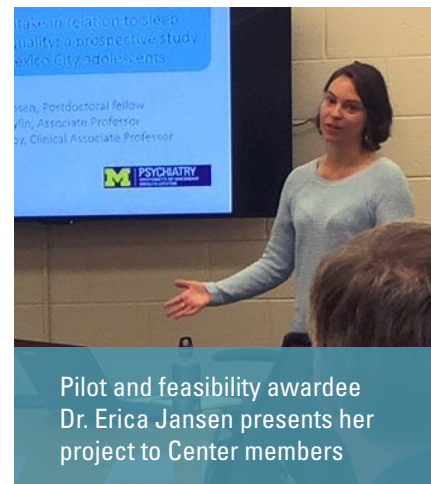


## PILOT AND FEASIBILITY PROJECTS

The goal of the Momentum Center Pilot and Feasibility Funding Program is to provide financial support for Momentum Center investigators that will allow them to pursue innovative research related to childhood obesity. A study team representing at least two distinct disciplines is required. Post-doctoral fellows with a faculty mentor became eligible to apply for funding starting in 2016.

The Pilot and Feasibility Funding Program supports the:

- Development of collaborative working relationships;
- Formation of new research ideas through the cross-disciplinary innovation process;
- Enhancement of current research methodologies; and/or
- Generation of preliminary data to support the pursuit of future extramural funding opportunities.



The table below lists the nine projects to date that have received funding from this mechanism.

Year	Project Title	U-M Investigators
2014	The WINNERS Group: Weight Increases Negated by New Exercise Regimens	Richard Dopp (Psychiatry) MinKyoung Song (Nursing) Ann Mooney (Psychiatry)
2014	Using a Mobile Phone Application to Assess Time Use, Physical Activity and Obesity	Natalie Colabianchi (ISR, Kinesiology) Joyce Lee (Pediatrics, Public Health)
2015	Provider and patient perceptions of weight-related terminology and conversations: Developing best practices for talking to adolescents about weight	Kendrin Sonnevile (Public Health, CHGD) Terrill Bravender (Pediatrics)
2015	Self-Regulation and Obesity Risk in Young Children	Leah E. Robinson (Kinesiology, CHGD) Alison Miller (Public Health, CHGD)
2016	Maternal Executive Function and Childhood Obesity	Katherine Bauer (Public Health) Julie Lumeng (Pediatrics, CHGD, Public Health)
2016	Food parenting under stress: An adaptation of a preschool parenting intervention to address feeding beliefs and behaviors	Megan Pesch (Post-doctoral fellow, Pediatrics) Mentor: Alison Miller (Public Health, CHGD)
2017	Assessing the relationship between parental cooking and food skills and child diet quality and weight status	Julia Wolfson (Public Health) Noura Insolera (ISR)
2017	Fatty acid intake in relation to sleep duration and quality: a prospective study among Mexico City adolescents	Erica Jansen (Post-doctoral fellow, Public Health) Mentor: Ana Baylin (Public Health)
2017	The programming effect of maternal obesity on metabolism and metabolic inflammation	Eric Chang (Post-doctoral fellow, Pediatrics) Mentor: Kanakadurga Singer (Pediatrics)

## Results

### Externally Funded Grants

1. NIH R01 Admin Supplement to "A PATH (Promoting Activity and Trajectories of Health) for Children." (PI: Robinson)
2. Endocrine Research Grant from the Endocrine Fellows Foundation, "The programming effect of maternal obesity on metabolism and metabolic inflammation" (PI: Post-doctoral fellow Eric Chang)

# COLLABORATIONS

The Momentum Center values collaborations both internal and external to the University. These partnerships create opportunities for expansion of member and Center knowledge, ideas and generation of innovative childhood obesity solutions.

## Internal Collaborations

### Michigan Nutrition Obesity Research Center (MNORC)

The MNORC began in 2010, funded by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The MNORC is one of 12 U.S. centers designed to inspire and support translational, multi-disciplinary research in obesity and nutrition, across the continuum of basic science to applications in individuals (medicine) and populations (public health). Dr. Karen Peterson serves as both the Associate Director of the MNORC and the Director of the MNORC Enrichment Program. To this end, she works to promote active collaboration and interchange among MNORC investigators; foster interactions of researchers from diverse, relevant disciplines that can drive discovery and innovation in nutrition and obesity research; and support training campus-wide in nutrition, obesity and related disciplines.

### Pediatric Obesity Symposium:

An example of the collaboration between the Momentum Center and the MNORC is the co-sponsorship of the Pediatric Obesity Symposium in October 2016. The symposium featured presentations from U-M junior faculty as well as outside speakers, promoted interaction among U-M investigators across a translational continuum and offered a poster session for pre- and post-doctoral trainees and research staff. The symposium attracted approximately 150 participants from across campus and the community and featured the following talks:

- Dr. David Ludwig, Professor, Harvard University: "Which Comes First: Overeating or Obesity?"
- Dr. Brian Wansink, Professor, Cornell University: "Slim by Design: From Mindless Eating to Mindlessly Eating Better"

- Dr. Margo Wootan of the Center for Science in the Public Interest: "Child Nutrition Policies: Supporting Healthy Eating"
- Dr. Marie-France Hivert, Associate Professor, Harvard University: "Understanding Pathways of Fetal Metabolic Programming to Stop the Transgenerational Risk of Diabetes"
- Dr. Katherine Bauer, Assistant Professor of Nutritional Sciences, University of Michigan: "It's All My Mom's Fault: Examining Evidence of the Impact of Parenting on Childhood Obesity"; and
- Dr. Darleen Sandoval, Assistant Professor of Surgery and Nutritional Sciences, University of Michigan: "Using Genetics to Understand GFP-1 Physiology"

Dr. Katherine Bauer is a Momentum Center member and Dr. Darleen Sandoval is a Momentum Center Steering Committee member. Video recordings of all the presentations can be found on the Momentum Center website ([momentumcenter.org/resources](http://momentumcenter.org/resources)).



Dr. Peterson facilitates a panel discussion with speakers at the Pediatric Obesity Symposium.

### School of Public Health Department of Biostatistics

Recognizing the need for Momentum Center members to develop stronger connections to biostatisticians in order to be competitive for external funding, the Center, with the help of Steering Committee member and Professor of Biostatistics Peter Song, coordinated a network of 11 Biostatistics faculty who are interested in working with Momentum Center members on mutually beneficial research collaborations and grant opportunities. A list of these faculty, along with contact information and summary of expertise, is available to Momentum Center members to facilitate connections.

### School of Public Health Innovation Studio

Capitalizing on the resources of the School of Public Health Innovation Studio and opportunity to infuse design thinking into projects, the Momentum Center has partnered with the Innovation Studio to develop cross-disciplinary research ideas. For example, results from a Momentum Center funded pilot and feasibility project were brought to the Innovation Studio for a “sprint” to further develop the idea for an externally funded grant submission. In addition, the Momentum Center and Innovation Studio are currently working together to develop and host a design workshop for Momentum Center members to creatively use the data available from the Healthy Families Project.

### Examples of Other Internal Momentum Center Collaborations

#### The Second Epidemiologic Transition Symposium:

In March 2015, the Momentum Center co-sponsored the semi-annual Center for Molecular and Clinical Epidemiology of Infectious Diseases (MAC-EPID) symposium. This event was open to students, faculty and staff and featured the following talks in addition to luncheon discussions:

- Dr. Linda Adair, Professor University of Carolina at Chapel Hill: “The Dual Burden of Undernutrition and Obesity in Individuals, Households and Communities: A Global View”
- Dr. Camila Corvalán, Assistant Professor, University of Chile: “From Undernutrition to Obesity: the Growth and Obesity Chilean Cohort Study”
- Dr. Juan Rivera, Director of the Center on Nutrition and Health, National Institute of Public Health, Mexico: “Are Current Policies Tackling the Double Burden of Malnutrition in Latin America?”



Momentum Center member Dr. Dana Dolinoy was featured in *The Raising of America* documentary

### Screening of *Raising of America*:

In January 2016, the Momentum Center was the lead in organizing a screening of the documentary *The Raising of America*, a five-part series on early childhood and the future of our nation. In addition to the Momentum Center, the event was sponsored by the Center for Human Growth and Development, the School of Public Health Office of Public Health Practice, the Michigan Youth Violence Prevention Center, the Health Equity Speaker Series, the Department of Psychiatry, the Michigan Center on Lifestage Environmental Exposures and Disease, and the Prevention Research Center.

Episode five (titled “DNA is Not Destiny”) of the series featured Momentum Center member Dr. Dana Dolinoy, who led a discussion of this episode. In addition, member Dr. Alison Miller was the opening speaker and community partners participated in the discussion panel. The four-day viewing was attended by community members as well as faculty and students from multiple disciplines at U-M (e.g., SPH, Pediatrics, Nursing, Psychology).

### External Collaborations

#### Patient-Centered Outcomes Research Institute (PCORI)

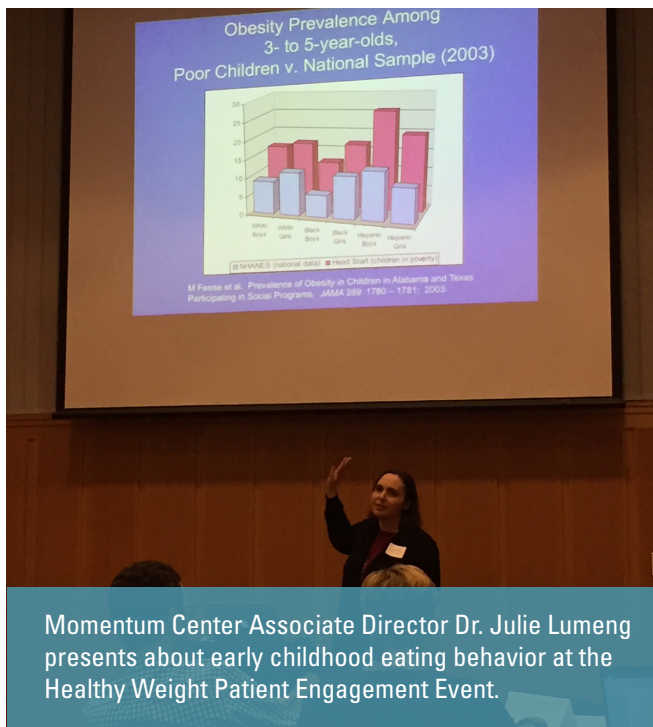
PCORnet, the National Patient-Centered Clinical Research Network, is an innovative, nationwide initiative of the Patient-Centered Outcomes Research Institute (PCORI). PCORI is designed to make it faster, easier, and less costly to conduct clinical research than is now possible by harnessing the power of large amounts of health data and patient partnerships. In the process, it is transforming the culture of clinical research from one directed by researchers to one driven by the needs of patients and those who care for them.

The University of Michigan is part of the Patient-Centered Network of Learning Health Systems (LHSNet), one of 13 clinical data research networks within PCORnet. NS Assistant Professor Dr. Katherine Bauer leads the national LHSnet obesity workgroup, with Momentum Center Executive Director Lindsey Mitchell providing project management support.



### Healthy Weight Patient Engagement Event:

In March 2017 the Momentum Center, in collaboration with the Patient-Centered Network of Learning Health Systems (LHSNet), held a healthy weight patient engagement event. It was a chance to hear from individuals (whether they struggle with their own weight, are concerned about their child's weight, just have an interest in nutrition and obesity in general, etc.) about what their priorities are when it comes to nutrition and obesity research. A brief presentation of healthy weight research topics being addressed at U-M was also provided and participants were provided with resources for healthy weight management. As a result of this event, 17 people signed up to be part of our Healthy Weight Advocate Network. This network includes individuals who are interested in healthy weight research at U-M and who are willing to serve as stakeholders/advocates/consultants for this research.



### Regional and State Partnerships

The Momentum Center Executive Director, Ms. Mitchell, regularly participates in the following regional and state partnerships related to childhood obesity:

#### Michigan Health and Wellness 4x4 Partnership

The Michigan Health and Wellness 4 x 4 Partnership is an alliance dedicated to reducing obesity in Michigan through strategic initiatives to create healthier environments, systems and policies that make physical activity, healthy eating and smoke-free living easier where we live, work, learn and play. The 4 x 4 Partnership is currently working to help Michigan worksites create policies and practices to support a healthy worksite and encourage healthy behaviors across multiple sectors. Ms. Mitchell attends quarterly partnership meetings and participates in the Evaluation Workgroup.

#### Michigan Organizations To Impact Obesity & Nutrition (MOTION) Coalition

The mission of the MOTION coalition is to accelerate organizational and community efforts that promote physical activity and healthy eating to optimize health and well being. The group includes many organizations from across southeastern Michigan and Ms. Mitchell regularly attends the quarterly meetings.

#### Project Healthy Schools

Project Healthy Schools (PHS) is a school-based program from the U-M to reduce childhood obesity and its long-term health risks. Focusing primarily on sixth grade students, PHS teaches youth healthy habits, develops healthy school environments, and creates an infrastructure that supports program sustainability and replication. Ms. Mitchell attends PHS steering committee meetings where she provides input on the program.

# CORE RESOURCES

## Data Access and Analysis

The Momentum Center facilitates access to existing datasets as well as to a network of statisticians interested in serving as co-investigators on member research projects.

## Human Phenotyping Core (HPC), co-sponsored with the Michigan Nutrition Obesity Research Center (M-NORC)

The Momentum Center provides services via the HPC to support obesity research through a variety of mechanisms:

- **Guidance with study design and selection of appropriate methods:** Experts are available to discuss study needs, recommend methods, and provide consultation for grant development and study implementation.
- **Dietary Assessment:** Staff are available to collect, organize, and analyze dietary data (e.g. 24-hour dietary recalls and food records) to ensure high quality, accurate data using standardized and reliable procedures, such as the Nutrition Data System for Research (NDSR) software.
- **Nutrition Counseling:** Dietitians are available to provide study-specific nutrition counseling to study participants and to develop study-specific menus.
- **Preparation of study meals:** A full metabolic kitchen and staff are trained to develop, prepare, and deliver study-specific timed, calculated meals or standard diets.
- **Training:** Staff are available to train study staff to collect dietary data using food frequency questionnaires or food records and to collect anthropometric data. Specialized NDSR trainings are also available.

Additionally, the Momentum Center is a partner on the \$11.9M national evaluation of the United States Child Care and Adult Feeding Program administered by USDA led by Abt Associates. For this project entitled “The Study of Nutrition and Activity in Child Care Settings” (SNACS), HPC manager Sarah Ball, MPH, RD and Karen Peterson, Momentum Center Director, created and tested several instruments used to measure the food intake of children during their time at child care and at home, as well as instruments used to measure child

height and weight. Ms. Ball was also the lead trainer on these instruments during a 10 day intensive training of field staff for this nationwide evaluation in Houston, Texas in 2017. Results from the SNACS study, forthcoming in 2019 and 2020, will be compiled into Final Reports and presented to both the USDA and Congress as part of the Healthy Hunger-Free Kids Act of 2010. In

addition, results will be presented to the public through many academic publications and will inform potential changes to CACFP policies and programming.



Sarah Ball, MPH, RD,  
Manager, Human  
Phenotyping Core

## Results

### Publications

1. Kasper N, Mandell C, Ball S, Miller AL, Lumeng J, Peterson KE. The Healthy Meal Index: A tool for measuring the healthfulness of meals served to children. *Appetite*. 2016. 103:54-63.

### Externally Funded Grants

1. USDA/Subcontract with Abt Associates, “Study of Nutrition and Wellness Quality in Childcare Settings” (PI: Peterson)

### Leveraged Internal Funding

1. U-M Population Study Center/ISR, “Harmonizing childhood health and obesity in longitudinal studies from low, middle and high income countries” (PI: McEniry)

### Products

1. Development of a common catalog (see the “Childhood Obesity” link) of datasets for obesity research.
2. Coordination of a network resource list of U-M Biostatistics faculty who are interested in collaborating with Momentum Center investigators on grant opportunities.
3. Creation of instruments to measure child food intake, height and weight, including the Healthy Child Care Menu Score.
4. Creation of the Healthy Meal Index to measure the healthfulness of meals served at family times.



# TRAINING THE NEXT GENERATION OF CHILDHOOD OBESITY RESEARCHERS

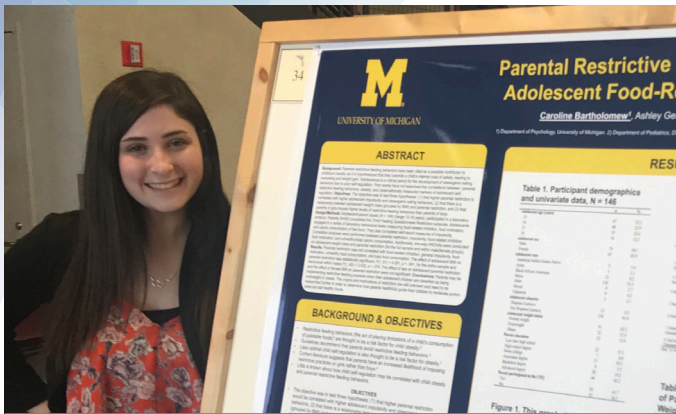
The Momentum Center is dedicated to building a cadre of student, post-doctoral trainees and junior faculty researchers who will make significant contributions to the science of prevention and management of childhood obesity. In addition to the pilot and feasibility funding mechanism, the following opportunities are offered through the Momentum Center to facilitate learning and establish research:

## Student Internship Program

The Momentum Center Student Summer Internship program provides summer stipend support for students to pursue research interests related to childhood obesity. Projects can be directly connected to ongoing Momentum Center projects, or can explore new research ideas that are not related to current initiatives, as long as the projects relate to child obesity. Enrolled University of Michigan undergraduate and graduate students and their identified mentor are eligible to apply. Mentors must be U-M faculty and members of the Momentum Center.

The table below lists the 12 projects to date that have received funding from this mechanism.

Year	Project Title	U-M Student and Mentor
2014	Epigenetics Assay Optimization for Studies Investigating Childhood Obesity	Joseph Kochmanski (PhD student, SPH/EHS) Mentor: Dana Dolinoy (Public Health, CHGD)
2014	Creation of Interactive Data Visualizations to Illustrate the Burden and Epidemiology of Childhood Obesity	Jianqi Chen (MS, School of Information) Mentor: Joyce Lee (Pediatrics, SPH)
2015	Epigenetic Evaluation of Prenatal High Fat Diet Exposure in Childhood Obesity	Carly McCabe (MS student, Public Health-NUTR) Mentor: Dana Dolinoy, PhD (Public Health/EHS/NS)
2015	Cultural Influences on Healthy Behaviors in African American Youth	John Spooner (MS, Kinesiology) Mentor: Rebecca Hasson (Kinesiology)
2015	Disordered Eating, Weight Bias, and Message Credibility in Young Adults Who Watch "The Biggest Loser"	Kelley Borton (MPH student, Public Health-NUTR) Mentor: Kendrin Sonnewald (Public Health, CHGD)
2016	Correlations Between Cheek Cell Fatty Acids and Dietary Fatty Acid Intake Among School-Aged Children	Dongqing Wang (MPH student, Public Health-EPID) Mentor: Ana Baylin (Public Health)
2016	Motor Skill Competence: A Potential Confounder of Self-Regulation and Obesity Risk in Young Children	Cecilia Bala (Undergrad, LS&A) Mentor: Leah Robinson (Kinesiology, CHGD)
2016	Exploring Adolescents' Use of Social Media and Technology-Based Self-Monitoring for Weight Management	Samantha Hahn (PhD student, Public Health-NUTR) Mentor: Katherine Bauer (Public Health)
2016	Parental Restrictive Feeding Behaviors and Adolescent Food-Related Self-Regulation	Caroline Bartholomew (Undergrad, Psychology) Mentors: Ashley Gearhardt (Psychology), Megan Pesch (Post-doctoral fellow, Pediatrics)
2017	The Use of Neuroimaging in Understanding Childhood Obesity (Project Media and ABC Brains)	Ruby Siada (Undergrad, Biopsychology, Cognition and Neuroscience) Mentor: Ashley Gearhardt (Psychology)
2017	Associations Between Maternal Carbohydrate Intake During Pregnancy and Child Adiposity and Metabolic Risk in Adolescence	Molly Carter (MS student, Public Health) Mentors: Wei Perng (Public Health), Dave Bridges (Public Health)
2017	Developmental Programming of Early Life Adiposity by Postnatal High Fat Diet and the Potential for Maternal Metformin Exposure to Improve Offspring Metabolic Outcomes	Zachary Carlson (Undergrad, Biochemistry) Mentor: Brigid Gregg (Pediatrics)



Undergraduate student Caroline Bartholomew with her project poster at the 16th Annual Pediatric Research Day at Wayne State University



Dr. Michael Goran visited through the junior faculty training initiative and discussed his research with Center members.

## Grant workshops

The Momentum Center hosts grant workshops that allow faculty and post-doctoral trainees to present their grant aims and summaries to obtain cross-disciplinary feedback that can help strengthen proposals. In addition to supporting the work of the individual, these presentations also offer the opportunity for discourse on new topics, resources, and can catalyze synergies for collaboration.

Pilot and feasibility funding awardees are required to present their projects at the beginning of the funding period both to inform Center members of current projects, and so that awardees can gain input and guidance regarding how to best move the projects forward.



Dr. Durga Singer, Assistant Professor of Pediatrics (left) received mentorship from Dr. Goran.

## Junior faculty training initiative

The Momentum Center recently launched a junior faculty training initiative that includes inviting a national childhood obesity scholar to the U-M to mentor a specific junior faculty member, review a grant and/or aims via a

Center grant workshop, network with Center members, and provide a seminar.

## Childhood obesity learning opportunities

The Momentum Center provides on its website resources for students who are interested in childhood obesity. This includes a list of U-M courses that are related to obesity, as well as a directory of local obesity prevention programs that students can contact for hands-on programming experience.

## Connecting students to researchers

The Momentum Center Executive Director interviews students who are interested in childhood obesity research and then sends information about the student to Center membership. This allows for students to connect with child obesity researchers in a way that reduces the amount of time faculty need to spend on individual interviews.



*"As a postdoctoral fellow in the School of Social Work, the Momentum Center has provided me with the incredible opportunity to engage in cross-disciplinary dialogue on the issues surrounding childhood obesity, health disparities, and social injustice. As a result of these critical conversations, I was able to generate mentoring relationships within the Momentum Center that led to the successful funding of a Robert Wood Johnson Grant examining the role of financial stress and early childhood stressors on the family unit and mealtime environment."* - **Brittany Schuler, PhD, LSW**, Postdoctoral Fellow, Social Work

## Results:

### Promotion/Advancement of Faculty and Trainees

Momentum Center faculty members and trainees who have advanced since Center inception:

Name	Momentum Center Affiliation	Initial Title	Promoted Title & Affiliation
Dr. Karen Peterson	Director; Steering Committee Member; Member	U-M Professor	Chair of Nutritional Sciences Dept
Dr. Julie Lumeng	Momentum Center Associate Director; Steering Committee Member; Member	U-M Associate Professor	U-M Professor
Milton Curry, M. Arch	Momentum Center Steering Committee Member; Active Class PI; Member	U-M Professor and Senior Associate Dean	Dean, University of Southern California School of Architecture
Dr. Dana Dolinoy	HFP Cube #2 PI; Member	U-M Associate Professor	U-M Professor; Chair of Environmental Health Sciences Dept (Jan 2018)
Dr. Joyce Lee	Steering Committee Member; Member	U-M Associate Professor	U-M Professor
Dr. Alison Miller	P&F Director; Steering Committee Member; Member	U-M Assistant Professor	U-M Associate Professor
Dr. Natalie Colabianchi	P&F awardee; Member	U-M Research Assistant Professor	U-M Associate Professor
Dr. Wei Perng	Grant workshop presenter; Member	U-M Research Assistant Professor	Assistant Professor, Colorado School of Public Health (Jan 2018)
Dr. Megan Pesch	P&F Awardee; Grant workshop presenter	U-M Post-doctoral Fellow	U-M Clinical Lecturer
Dr. Cin Cin Tan	Grant workshop presenter; Member	U-M Post-doctoral Fellow	U-M Research Investigator
Dr. Sarah Domoff	Grant workshop presenter (2x)	U-M Post-doctoral Fellow	Clinical Faculty, Central Michigan University

### Publications

1. McGlumphy KC, Gill AK, Shaver ER, Ajbewa TA, Hasson RE. Perceived Stress Predicts Lower Physical Activity in African-American Boys, but Not Girls. *Am J Health Behav.* 2018;42(2):93-105.
2. Nelson DS, Gerras JM, McGlumphy KC, SHaver ER, Gill AK, Kanneganti K, Ajbewa TA, Hasson RE. Racial Discrimination and Low Household Education Predict Higher Body Mass Index in African American Youth. *Child Obes.* December 2017. [Epub ahead of print].

### Externally Funded Grants

1. NICHD/NRSA F-32, "Low-income mothers' media cognitions and practices as child obesity risk factors" (Post-doctoral fellow Sarah Domoff)
2. NIH R03, "Maternal-Infant Feeding Interaction and Weight Gain Among Infants" (Post-doctoral fellow Cin Cin Tan)
3. Robert Wood Johnson Foundation New Connections Program, "Healthy Eating, Healthy Children: Understanding Longitudinal Mechanisms of Stress, Parenting and Healthy Eating Habits" (Post-doctoral fellow Brittany Schuler with mentor Miller)



## TRANSLATING AND SHARING FINDINGS

The Momentum Center translates and shares childhood obesity research findings so that this evidence is accessible to stakeholders (advocates, community partners, policy makers and others). Information is shared via:

### Momentum Center website

The site is updated frequently and includes news, member profiles and publications, project information, funding details, and resources.

### Social and other media

The Momentum Center has an active Twitter account, launched in July 2016, and posts at least 3 times per week. In addition, recent Momentum Center media coverage has included:

- Articles in Modern Health (8/17/16) and Michigan Research (9/21/16)
- Radio interview with WWJ (10/9/16)
- InPACT project Big Ten Commercial (1/15/17)

The Momentum Center also coordinated a member training from a senior U-M Public Relations Strategist in Fall 2016 on how faculty can share their research and collated a list of members willing to be included on the Michigan News website as obesity experts for the media.

### Presentations, conferences and events

Momentum Center members are active in sharing their findings. A sample of where research from Momentum Center project findings have been presented recently include:

- DesignMarch Conference 2017 (Iceland)
- Active Living Research Conference 2017 (Clearwater Beach, FL)
- U-M Center for Exercise Research Seminar (Ann Arbor, MI)
- Society of Health and Physical Educators Michigan 120th Annual Convention (Mackinac Island, MI)
- Michigan School Health Coordinators' Association 2017 Connecting Kids Through School Health Conference (Boyne Mountain, MI)
- 7th African American Collaborative Obesity Research Network National Workshop (Philadelphia, PA)
- The Obesity Society Annual Meeting at ObesityWeek 2016 (New Orleans, LA)
- North American Society for the Psychology of Sport and Physical Activity Conference (Montreal, Canada)
- The American Society for Pharmacology and Experimental Therapeutics (ASPET) meeting at Experimental Biology (Chicago, IL)



Member Ulysses S. Vance presents at DesignMarch Conference in Iceland



## OUR GOALS: 2016 – 2020

In the Fall of 2015, a strategic analysis under the leadership of Ms. Mitchell was conducted for the Center that included 31 interviews with members, leadership and other stakeholders and a benchmark analysis of 16 childhood obesity centers throughout the United States. The findings from this analysis, along with additional information gathered from steering committee, member, and internal advisory board meetings, guided the development of a strategic plan that moved the Momentum Center into its next stage of growth.

The Momentum Center goals and objectives identified in the 2016-2020 strategic plan are:

- **Enhance member and center development and delivery of innovative childhood obesity solutions.**
  - Offer educational and/or other opportunities for Center members to learn and apply innovative techniques and approaches to childhood obesity research.
  - Develop opportunities to engage in discourse and learning with stakeholders outside of the University to expand member and Center knowledge, ideas and generation of childhood obesity solutions.
  - Expand Momentum Center support into topic areas and relationships that we have not yet explored or that are underdeveloped.
- **Establish and implement mechanisms and strategies that will result in additional Center funding.**
  - Develop and refine tools and resources needed for the Momentum Center to be well-positioned to compete for funding opportunities.
  - Create processes to systematically capture and share Momentum Center successes.
  - Secure funding for the Momentum Center that will enable it to exist after initial seed funding is exhausted.
- **Continue to build and strengthen center member relationships and cross-disciplinary collaborations, member resources, and opportunities for members to learn about and share childhood obesity research.**
  - Offer more opportunities for Center members to interact, share research, and develop new research ideas and collaborations.
  - Define and enhance member resources.
  - Increase the opportunities offered by the Momentum Center for members to learn about childhood obesity research.
  - Increase the diversity of the disciplines represented by Center membership.
- **Enhance and increase the amount of childhood obesity research training opportunities offered by the Momentum Center.**
  - Develop and offer additional opportunities to enhance junior faculty training in childhood obesity research.
  - Develop and offer additional opportunities to enhance student and post-doctoral training in childhood obesity research.
  - Develop and offer a formal Momentum Center training program or certification.
- **Increase local, regional and national awareness of the University of Michigan's Momentum Center as the premier institution for innovative cross-disciplinary childhood obesity research and training.**
  - Build a Momentum Center brand that emphasizes innovative cross-disciplinary childhood obesity research and training.
  - Set marketing goals, objectives and strategies for the Momentum Center.
  - Engage in opportunities to increase awareness of the Momentum Center.
- **Translate and share childhood obesity research findings so that this evidence is accessible to stakeholders (advocates, community partners, policy makers and others).**
  - Engage in opportunities to build and foster partnerships that would benefit from translation of childhood obesity research findings or that would provide connections to groups who would benefit.
  - Present childhood obesity research findings in venues open to community members.
  - Develop and provide tools and resources related to childhood obesity research findings on the Momentum Center website.
  - Communicate regarding childhood obesity research findings and learning opportunities via social media.