Changing the way we think about food – the health of the next generation depends on it.
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At the Heart of Health Care Transformation

The health care world is moving through many fundamental and exciting changes. A foundational aspect of these changes is the expansion of our definition of what constitutes a "patient." Initiatives related to health care reform are helping society to focus new attention on population health and preventive medicine, and expand our thinking beyond the individual. This new direction is nothing less than a health care revolution and the OHSU Bob and Charlee Moore Institute for Nutrition & Wellness is an essential part of this transformation.

Emerging research shows that the fetal environment, in particular nutrition, affects our genes and, consequently, our adult disease profile, including chronic diseases such as diabetes, heart disease, and obesity. Through epigenetic effects, these outcomes are passed down to offspring, shaping the incidence of chronic diseases in future generations. With its focus on translating this vital research – known as the “developmental origins of health and disease” – into the public sphere, the Moore Institute is providing an unprecedented degree of leadership in this evolving paradigm that has the potential to reshape the health of future generations.

This leadership – as described in this annual report – crosses multiple areas and intersects in ways that will change the way society thinks about chronic disease. In short, it’s not an individual patient problem, it’s an issue society must tackle at the population level. Under Dr. Kent Thornburg’s direction, the institute is acting boldly across policy, marketing, community outreach, physician education, childhood education and other areas to alter the health care landscape.

An example that’s already making headway is the change in how future physicians are educated. Historically, physicians have not been taught to counsel patients on nutritional issues generally, nor on the epigenetic impact of nutrition. Through the influence of the Moore Institute, a newly designed curriculum for medical students threads nutrition education and dietary counseling strategies throughout the first 18 months of training.

Incoming OHSU medical students now learn the fundamentals of nutritional science and its role in chronic disease. Students are taught to identify individuals and families at nutritional risk and how to counsel them about good nutrition and exercise practices. In addition, students learn to apply health promoting behaviors to their own lifestyles to serve as role models for their patients.

In turn, these new methods are being shared throughout the country with other medical schools as part of OHSU’s partnership with the American Medical Association to accelerate change in physician education. The ripple effect of the Moore Institute in just this one domain will, over time, be enormous in its impact across the training of our next generation of physicians and all care providers.

The Moore Institute envisions a future in which similar innovations gain the momentum needed to accelerate the pace of change, and in which individuals have availability and easy access to healthy choices like nutritious whole foods. The Moore Institute doesn’t just envision this future, it is working hard to help alter the nutritional well-being of communities everywhere, and ultimately, to spark a movement to end chronic disease where it starts. We’re fortunate to have the generosity of Bob and Charlee Moore and their founding gift establishing the Moore Institute at the root of this movement.

Best regards,
Mark Richardson, M.D., MBA
Dean, OHSU School of Medicine

Creating a Healthier Tomorrow

While this is only the third annual report of the OHSU Bob and Charlee Moore Institute for Nutrition & Wellness, the accomplishments of the institute resemble a much more mature organization. In three short years, we have taken a healthy bite out of our ambitious agenda to fight chronic disease through changing the way people think about food and health.

While we’ve made major strides during the past three years, we have a long way to go. Data trends from the Centers for Disease Control and Prevention and the National Institutes of Health point to an urgent need for public understanding of the causes of chronic disease. This urgency is not based on some isolated health finding, but on a host of indicators that reveal the rapid decline of our nation’s health. More Americans each year continue to put on weight, develop type 2 diabetes and have uncontrolled blood pressure. These factors, along with persistent poor blood fat profiles, point to increasing risks for Americans to acquire heart disease. We can expect health care costs to increase dramatically during the next two decades to care for these expensive medical conditions.

These sobering facts drive us to take action. Work from OHSU and global colleagues show that a population’s vulnerability for chronic disease is determined by the stress and nutrition levels they experience before birth. For the past few generations, Americans have moved away from eating wholesome foods to diets composed of processed and fast foods. Pregnant women are no exception. Poor maternal diets and high levels of maternal fat lead to poor fetal development and high risk among offspring for acquiring chronic disease later in life. This is the most important reason for declining health in Oregon and the nation. It will not be possible to reverse the trend of worsening health in the American population without first addressing the nutrition and well-being of adolescent girls and women who are pregnant.

The Moore Institute’s mission is to reduce the prevalence of chronic disease throughout the lifespan by promoting healthy, nutrient-rich diets based on wholesome foods before conception, during pregnancy and lactation, and in infancy and early childhood. We envision a future where all public schools have strong nutrition education programs and healthy food choices, where health care practitioners are versed in nutritional therapy, and where strong public policies help everyone have easy access to healthy, nutritious food and lower levels of stress. The Moore Institute wants to be the driving force to catalyze a movement for the health of Oregonians. We want Oregon to be the best place for babies to be born and grow into healthy adults. In short, we want a future where chronic disease is stopped where it begins – in the womb.

Lastly, we want OHSU to be increasingly woven into the fabric of the Oregon community for the purpose of improving the health and well-being of all Oregonians. Creating a healthier Oregon will take all of us working together. To that end, the Moore Institute is creating a digital hub to serve as an online gathering place for community members to learn, share and take action. Join the dedicated members of the Moore Institute and Bob’s Red Mill to help us spur this movement forward.

Sincerely,
Kent Thornburg, Ph.D.
Director, OHSU Moore Institute for Nutrition & Wellness
Changing the Landscape of Health

In September 2011, Bob and Charlee Moore of Bob's Red Mill Inc. pledged $25 million to form a partnership with OHSU to confront one of the biggest contributors to the recent rise in chronic disease: poor nutrition. The pledge established the OHSU Bob and Charlee Moore Institute for Nutrition & Wellness.

Three years following its launch, The Moore Institute has made major strides in promoting healthy nutrient-rich diets to combat the origins of chronic disease. During the past three years, the Moore Institute has:

- Funded three founding research projects that developed a computer game and curriculum on epigenetics for middle-school students; developed an exercise and nutrition team-based program for pregnant women; and investigated the developmental origins of attention deficit hyperactivity disorder (ADHD).
- Established international collaborations with scientists in England, Finland, France, India, the Netherlands, New Zealand, Saudi Arabia and Tunisia.
- Developed the International Fellows Program to build an international coalition of senior scientists working in the field of developmental origins of health and disease (DOHaD).
- Received a major award from the Bill and Melinda Gates Foundation to host the first International Summit on the Nutrition of Adolescent Girls and Young Women in May 2015.
- Worked with local partners to develop curriculum on nutrition and health for use in K-12 Oregon schools.
- Contracted with external creative and strategic communications agencies to develop a digital hub to spark a social movement toward changing our food culture with specific action steps.
- Hosted multiple nutrition consortiums across the state bringing together nutrition groups and government workers to share knowledge, resources and form partnerships.
- Met with the governor's policy council as well as other legislative committees to discuss the role of nutrition during pregnancy and early life on the health of Oregonians and possible policy implications toward improving public health.
- Engaged groups working with Hispanic and African American populations to develop ethnically-specific nutrition programs and promote the role of nutrition during pregnancy and early life.
- Worked with the OHSU School of Medicine to thread nutrition throughout the curriculum during the first 18 months of education for all medical students.

Moore Institute in the News

The Moore Institute is promoting healthy, nutrient rich diets and increasing awareness of the impact of nutrition on population health through varied media exposure. The institute's use of social media has increased, with more coverage on Facebook, Twitter and OHSU blogs such as 96K, allowing the institute to reach a wider audience.

2013–2014 selected news items:

- How Portlanders are forging the frontier of epigenetics – Portland Monthly, July 2014
- OHSU epigenetics game wins serious play award – Inside the SoM, July 9, 2014
- Going upstream for the health of the next generation – op/ed in The Bulletin, April 26, 2014
- Let’s Get Healthy! Teaching children about healthy food choices – Doernbecher Healthy Families blog, April 23, 2014
- National Nutrition Month: A good time to focus on healthy food choices – op/ed in The Oregonian, March 26, 2014
- Improving your health, one bite at a time – 96K blog, March 17, 2014
- OHSU program spreads the word about nutrition and epigenetics (epi-what?) – Portland Business Journal, March 14, 2014
- We are what we eat – and who we meet – The Daily Astorian, January 17, 2014
- OHSU study will examine low birthweight babies – The Daily Astorian, January 9, 2014
- Wallack, Merkley urge focus on root causes of health problems – The Lund Report, October 25, 2013
- Hundreds gather for Marquam Hill Lecture kick-off, Medicine Matters, October 25, 2013
- Public lecture: Kent Thornburg, Ph.D., to discuss origins of disease – OHSU Research News, October 17, 2013
- Latina health and a return to traditional food culture – 96K blog, September 19, 2013
- David Barker's legacy builds on a good 'first thousand days' of life – The Oregonian, September 10, 2013
- Diabetes and your health – eSalud Today, July, 2013
- Good nutrition now for a better future – Doernbecher Healthy Families blog, July 8, 2013

"We are often so busy pulling people out of the river downstream that we don't have time to go upstream, see what is causing them to fall in, do something about it. This work is changing how far upstream we can go. And reminding us that we’re upstream right now for the next generation." – Larry Wallack, in the Portland Tribune
The Moore Institute is meeting its mission to engage the community through training and outreach by participating in and leading events around Oregon and beyond, while translating essential information about the developmental origins of health and disease to the public.

2013–2014 selected events:

**October 4, 2013, Portland, Ore.**
Talk: Rethinking the origins of disease and modern public health
Portland State University Public Health Seminar

**October 7-8, 2013, Auckland, New Zealand**
Talk: The placenta is a programming agent in cardiovascular disease
University of Auckland Bioengineers Meeting

**October 17, 2013, Portland, Ore.**
Talk: Where does disease come from: Revealing secrets of epigenetics
OHSU Marquam Hill Lecture

**January 24, 2014, Portland, Ore.**
Talk: Environmental stressors in the womb lead to chronic disease
Institute of Environmental Health Seminar

**February 6, 2014, Vancouver, B.C., Canada**
Talk: The placenta drives the programming of chronic disease
Reproduction and Developmental Sciences Seminar, Child and Family Research Institute

**February 8, 2014, Portland, Ore.**
Talk: Epigenetic vulnerability for heart disease starts in the womb
Portland Academy of Pediatrics

Talk: Early Life Nutrition and Later Disease
National Migrant and Seasonal Head Start Program Conference

**February 28, 2014, Portland, Ore.**
Talk: Diet, epigenetics and fetal origin of adult-onset diseases
Oregon Psychiatric Association Continuing Medical Education Program – Winter Conference

**March 26-29, 2014, Florence, Italy**
Moderator/presenter: Maternal influences on offspring: cardiovascular vulnerability
Society of Reproductive Investigators

**April 3-5, 2014, Los Angeles, Calif.**
Talk: Is it time to discuss ending chronic disease?
National Bureau of Economic Research Cohort Studies Meeting

**April 24, 2014, Portland, Ore.**
Talk: Poor fetal nutrition is the cause of most chronic disease
Oregon Food Bank Network

**May 16, 2014, Portland, Ore.**
Talk: Understanding the fetal origins of disease
Portland Community College Seminar R25: Bridges to Baccalaureate

**May 21-22, 2014, Pendleton, Ore.**
Talk: Epigenetics
Early Learning Council, State of Oregon

**September 22, 2014, Cambridge, England**
Talk: Healthy Hearts: Picked from the family tree
Calius College

**September 26-28, 2014, Portland, Ore.**
Talks: Uncovering the roots of disease: epigenetics and diet; Wholesome food is the required therapy for our worsening population health
Enhancing Health with Plant-Based Nutrition VegFest
International Collaborations

OHSU Moore Institute Annual Report

International Fellows Program

Studies around the world have shown that inadequate fetal nutrition is associated with adult onset disease regardless of the country of origin. However, geographical variations exist in fetal nutrition and growth and in the pattern of diseases that predominate in different regions of the world. Because it would not be possible to understand these regional disease patterns without being connected to them, the Moore Institute has established collaborations with scientists in many countries across the globe. To formalize these collaborations, the Moore Institute has created the International Fellows Program.

International fellows will be asked to advise the Moore Institute on policy issues regarding international programs, to participate in a coalition of international experts on programming, and to foster collaboration between the Moore Institute and international programs in which they operate. These fellows will visit OHSU to work with the Moore Institute and share information with the broader scientific community. Appointments will be reviewed every five years. The first fellow has been named and others are in the process of being identified.

Tessa Roseboom, Ph.D.
Department of Clinical Epidemiology, Biostatistics and Bioinformatics
Department of Obstetrics and Gynaecology
Academisch Medisch Centrum (AMC), Amsterdam, The Netherlands

Roseboom leads the Fetal Origins Research Group at AMC, one of the most prominent medical centers in The Netherlands. For the past ten years she has led the Dutch Hunger Winter Cohort. This cohort follows more than 2,000 individuals born during the Dutch famine of 1944-45 and tracks metabolic, cardiovascular and other adverse health outcomes.

International Summit on the Nutrition of Girls and Young Women

The Moore Institute will host the International Summit on the Nutrition of Girls and Young Women in Portland, May 14-17, 2015. This first of its kind international summit will bring together global leaders in nutrition science and nutritional intervention to address pressing issues and foster dialogue around the health of girls and young women across the globe.

Maternal and child undernutrition is the underlying cause of some 3.5 million deaths annually and accounts for more than a third of the disease burden in children younger than five. The goal of the summit is to build new and enduring bridges between nutrition scientists and nutrition practitioners in developing countries. At present, these groups have little communication with one another, resulting in gaps between advances in nutrition research and the application of emerging knowledge to shape programs for undernourished populations.

The international summit will address:
- How food availability and food choices among girls and young women can be improved.
- What international and local policies and practices would benefit the status of women across the globe and improve their access to nutritious food.

Public symposium

The Moore Institute will host a public symposium the day prior to the start of the summit. Select world-renowned summit participants and local experts will speak on topics of relevance to Oregonians. The day will focus on the importance of nutrition from conception to age two in reducing risk for chronic diseases like heart disease and diabetes.
Media and Marketing Committee

The Media and Marketing Committee continues toward its goal of using innovative media and marketing tools to communicate about DOHaD research in ways that measurably increase awareness of the impact of nutrition on population health in target audiences.

2013-2014 selected activities:

- Finalized and received approval on a three-year marketing and communications plan that covers multiple audiences. The plan was a result of carefully considered engagements with brand, strategic communications and message framing experts who worked closely with Moore Institute scientists to develop a narrative framework for sharing the research.
- Focused on earned media in regional newspapers, magazines and blogs to achieve the goals of raising the profile of the Moore Institute and sharing research results.
- Aided in creation of radio spots promoting the Moore Institute. The spots, sponsored by Bob’s Red Mill, ran on All-Classical Portland 89.9 from January to mid-April 2014.
- Hosted a booth at the OHSU farmer’s market with the OHSU Center for Women’s Health where information about the Moore Institute, its mission and partnership with women’s health was shared.
- Co-sponsored a nutrition event focused on high school girls with the OHSU Center for Women’s Health.

Looking forward:

- The three-year plan includes initiatives to more predictably reach OHSU faculty and students, as well as peer researchers and physicians at other universities, community partners, policymakers and others through the development of a periodic newsletter. This project will be launched in the coming year.
- Design, construction and launch of the digital hub to serve as an online meeting space for compiling and sharing research results and inviting/supporting community advocacy through a variety of tools in order to support a movement to change the U.S. food culture.

Nutrition Education for Health Care Professionals Committee

The Nutrition Education for Health Care Professionals Committee continues to facilitate the integration of nutrition education, including the key concept of the effect of early nutrition on adult disease, for health care professionals throughout the greater OHSU community.

2013-2014 selected activities:

**School of Medicine Curriculum Transformation**

Nutrition is established as a “thread” that will run through the first 18 months of the OHSU undergraduate medical education curriculum. Student learning objectives are “laced” through each area of concentration to enhance nutrition knowledge, attitudes, counseling skills, and refer to/include care coordination with registered dietitians. Developmental origins and social/environmental determinants of health will be highlighted throughout.

**OHSU School of Medicine Interprofessional Nutrition-related Electives**

- Human Nutrition - faculty facilitators: Sonja Connor, M.S., R.D.; Carol Defrancesco, M.S., R.D.; Diane Stadler, Ph.D., R.D.
- Motivating Healthy Eating – faculty facilitators: Sonja Connor, M.S., R.D.; Carol Defrancesco, M.S., R.D.; Diane Stadler, Ph.D., R.D.
- Global Health: Interdisciplinary Community Health and Education Exchange (iCHEE) – faculty facilitators: Valerie Palmer; David Bearden, PharmD; Kathleen Birchfield, DMD, CDT; Teral Gerlt, R.N., M.S., WHCNP.

**National Institutes of Health R01 Grant Application (submitted June 2014):**

“Weight Management Counseling in Medical School: A Randomized Controlled Trial.” OHSU is one of 10 medical schools that will participate in this “multi-modal” trial when funded. Discussion and demonstrations about foods and food preparation along with motivational interviewing, individual and group counseling, and interactive skills-based behavior change strategies will provide the foundation for the curriculum. Preceptor training will enhance the competency-based assessment and reinforcement of skills during clinical rotations.

**Healthcare Professionals Initiatives**

- Presentation to the Oregon Academy for Nutrition & Dietetics annual meeting – Christie Naze, R.D. and Diane Stadler, Ph.D., R.D.
- Foster presentations at local, national and international meetings.
- Hosted and/or participated in professional organization meetings, including Portland Academy of Nutrition & Dietetics, Oregon Pediatric Nutrition Practice Group and Oregon Integrative Medicine Consortium.

Looking forward:

- Develop nutrition-related electives for OHSU School of Medicine.
- Develop breastfeeding initiative/lactation research with Early Infant Feeding Interest Group.
- Develop a short presentation or webinar about epigenetics and DOHaD illustrations with examples from scientific literature and applications for practice. Submit to local and national nutrition & dietetics practice groups for publication/dissemination.
Public Health and Policy Committee

The Public Health and Policy Committee has continued its path of generating a sense of urgency surrounding the DOHaD message and developing connections with key community leaders and policy decision makers.

2013-2014 selected activities:

• Briefing of Governor Kitzhaber and his senior policy advisors.
• Briefing of governor’s senior advisors on Health, Early Childhood Education and Head Start.
• Testimony to the Oregon House Health Care Committee.
• Presentation to the Multnomah County Board of Commissioners on the Maternal Child and Family Health Data Book and how policies addressed to these groups should consider the DOHaD concept of the first 1,000 days of life when vulnerabilities for chronic diseases are set.
• Presentation to Human Services Coalition of Oregon.
• Presentation to Asian Pacific American Network of Oregon.
• Presentation to the Interrogating DOHaD meeting, an exploratory workshop bringing together experts in child development from a variety of angles to identify new research questions to better understand the links between early exposures and negative developmental outcomes and their mediating mechanisms.
• Working with Urban League on upcoming report on the State of Black Oregon.
• Serving on the National Advisory Committee of Kellogg Foundation Best Babies Zone, a project to implement community wide strategies to reduce the number of low birth weight babies, and hosting a community leader presentation on the initiative.
• Keynote address to the Northwest Regional Primary Care Association.
• Development of the Food is Hope, Food is Health Initiative in East Portland, a collaborative that leverages cross-sector cooperation on the intersection of DOHaD and food systems strategies.

Looking forward:
The newly created Center for Public Health Studies at Portland State University will partner with the Moore Institute to advance community engagement and public policy issues surrounding the DOHaD message.

The center’s goals include:
• Assessing structural causes and consequences of health.
• Examining health behaviors in their social context.
• Studying the effects of the culture and the environment on our health and attitudes toward health care.
• Analyzing the political process and social policies that affect the health status of populations.

Nutrition Consortium

The Nutrition Consortium continues to work toward bringing Oregon’s nutrition experts together to address the diets and social conditions of girls and women of reproductive age and infants.

2013-2014 selected activities:

• Evaluated participant input from first Moore Institute Nutrition Consortium Forum on need for a statewide nutrition consortium and its potential purpose. Findings included:
  • Strong interest in collaboration with the Moore Institute to create a statewide consortium.
  • Desire for the Moore Institute to act as a convener for regional networking of nutrition programs, researchers and food policy experts.
  • Desire for an online space to share latest research, information on existing programs and best practices, and opportunities for collaboration within interested groups.
• Developed a five-year vision for the Nutrition Consortium and the mutually supportive roles it will play in furthering the mission and goals of the Moore Institute.
• Developed contacts for additional forums that could be held in Eastern and Southern Oregon.
• Reached out to the Nutrition Council of Oregon, a group of nutrition professionals concerned with public health nutrition issues that affect population groups in Oregon, resulting in Moore Institute membership on the council.
• Developed and sponsored the second Moore Institute Nutrition Consortium Forum. The forum was held in Corvallis and co-hosted with Benton County Health Services and Oregon State University’s Moore Family Center.

Looking forward:
The Nutrition Consortium will sponsor additional Moore Institute Nutrition Consortium Forums in Redmond and Medford.
Community Education and Outreach Committee

The Community Education and Outreach Committee is working with community groups to introduce whole-food-based, hands-on nutrition/culinary science experiences into daily activities of Oregon K-12 schools.

2013-2014 selected activities:

**Nutrition in a Box**
Modeled on the 'In a Box' science curriculum series, this will be a physically-compact, self-contained curriculum unit with structured lessons on healthy nutrition, basic culinary skills and their relevance to future physical and mental health targeted to 4th-8th grades. Project is continuing development and planned to be completed during 2015.

**Preconception/DOHaD Nutrition Curriculum for Young Girls and Women**
The Community Education and Outreach Committee is looking to develop or adapt an interactive, participant-driven, group-based program to actively engage and involve parents-to-be in acquiring and applying nutrition knowledge and culinary skills essential to healthy eating. Curriculum will include specific information on the importance of pre-conception and gestational nutrition to the health of future offspring and to future generations.

**Webinar Supporting Elementary-level Curriculum “Teaching Nutrition to Kids”**
A 30-45 minute webinar to introduce the Moore Institute, the developmental origins concept and the basics of how to use the “Teaching Nutrition to Kids” curriculum kit is in progress. The webinar will include short video clips of hands-on work with children in a garden setting and grocery shopping/label reading. Webinar file will be owned by the Moore Institute and will be posted on websites and available on CDs for wide distribution. The general content is outlined, final scripting is in progress with completion of the project expected in 2015.

**My Healthy Shopper Project**
This colorful, informative two-sided brochure pre-folded into a wallet-sized packet displays healthy food choices, nutrition contents and label reading guidelines. The Moore Institute has partnered with the brochure originator, the non-profit MIKE Program, to purchase and distribute with the OHSU logo. An evaluation tool is under development to assess utility, language clarity, impact and need for revisions for the general population. Familias en Acción will work with Moore Institute to adapt and evaluate the brochure for Hispanic populations. Future printings will incorporate this information.

Looking forward:

**Teacher/Food Corps Training and Support**
The February 2015 Nutrition in the Womb Course Series will focus on a general knowledge overview of the developmental origins science. It will target Food Corps Service members and K-12 school-based professionals, including teachers, administrators and health care professionals.

The financial expenses chart presented reflects the third year of operations of the Moore Institute for FY 2014 (July 1, 2013–June 30, 2014). Half of the annual gift revenues received from Bob and Charlee Moore are designated for operations of the institute. The other half of the gift is set aside and invested to support an endowed chair.

The expenses represent leadership and administrative support (infrastructure/payroll), overhead cost allocations, communications, three founding grants which were awarded in the first year of operations to be disbursed over time and other initiatives of the institute, including committee expenses and support for outreach such as symposiums and international collaboration.
Steering Committee

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Aaron Caughey, M.D., Ph.D.
Vice Provost, OHSU

Wellness Steering Committee

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OHSU Bob and Charlee Moore Institute for Nutrition & Wellness Mission Statement
At the OHSU Bob and Charlee Moore Institute for Nutrition & Wellness, we believe that reducing the prevalence of chronic diseases throughout life starts by promoting healthy, nutrient-rich diets based on wholesome foods – before conception, during pregnancy and lactation, and in infancy and early childhood. We support this in current and future generations by offering programs that:

- Engage the community through professional training and community outreach.
- Conduct research through human and community-oriented clinical and translational science.
- Provide clinical care through the development of new preventive measures and treatments.
- Address public policy issues to promote improved nutritional health in the community.

Committee Members
OHSU Moore Institute Annual Report

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Moore Institute Founding Research Projects

One of the Moore Institute’s foundational principles is the promotion of clinical and translational science to reduce the prevalence of chronic diseases across the lifespan in current and future generations by promoting whole-food nutrition before conception, during pregnancy and lactation, and in infancy and early childhood. The Moore Institute will accomplish this by harnessing existing strengths in research capacity at OHSU in the fields of nutrition and developmental origins of health and disease to create programs that address the complex clinical and social factors related to and arising from poor nutrition defined as poor dietary choices or unavailability of healthy foods.

Shortly after receiving the initial gift from Bob and Charlee Moore, the steering committee issued a request for letters of intent to fund several “founding” projects. Proposals could address any of the main mission areas of the Moore Institute: education, patient-oriented research, clinical care or public policy. Out of 56 proposals representing investigators from multiple institutions across the state of Oregon, six investigators were invited to submit a formal application and three were ultimately selected for funding.

These three projects were chosen for their emphasis on whole food nutrition, targeting of either pre-pregnant or pregnant women, their potential for evolving into a sustainable partnership with the Moore Institute, a strong possibility of achieving sustainable grant funding in the future and the likelihood for having a “high-impact” on the field of developmental origins. Funding for these proposals ran from July, 2012 through June, 2014. Following are final reports on their projects.

Project 1: Improving Adolescent Awareness of the Epigenetics of Generational Nutrition

Co-Principal Investigators: Jackilen Shannon, R.D., Ph.D., and Lisa Marriott, Ph.D.

How many middle schoolers have heard of epigenetics? And how many can tell you how nutrition affects long-term human health? Investigators Jackilen Shannon, R.D., Ph.D., and Lisa Marriott, Ph.D., set out to develop an interactive module that could help explain these two concepts. What they developed is a computer game designed to introduce middle school students to the concept of epigenetics and promote understanding of how their current behaviors, specifically dietary intake, can impact their health and the health of future generations.

As one of the Moore Institute’s initial funded projects, the “Nurture Your Nature” game leverages the resources of the OHSU Let’s Get Healthy! program to cover two of the Moore Institute’s priorities: educating the public about the importance of healthy food choices, and conducting research. The game leads students through four different levels learning about bees, mice and humans, applying the knowledge learned in questions following each section. The final section of the game allows users to create an avatar and ‘twin-ize’ them. Users then select behaviors for both themselves and their twin to see how individual choices can result in very different twins.

Investigators held focus groups with students, parents and teachers to present initial concepts. Once the game was created, they held a summer session for Oregon teachers to work with them to develop lesson plans and test the game. One of the teachers who came to the training session ended up working closely with the investigators to test the game in her school. The game launched at a school fair at St. Helens Middle School where 388 students visited the booth or played the game and filled out a pre-, post-, and end-of-school year survey. Compared to students who didn’t play the game, data show students who played the game are more likely to have heard about, and are interested in learning about epigenetics.

The game is available online for anyone to play at letsgethealthy.org in the students section. Investigators continue to work with teachers to encourage the game’s broad dissemination at community and school fairs. They have applied for additional funding to shorten the game and incorporate feedback from initial testing. The game garnered recognition beyond Oregon as well, winning a 2014 International Serious Play Award. The competition honors exceptional examples of corporate, military and educational games, as well as games for good. Investigators have been asked to present the game at the Serious Play Conference where they will gather additional feedback to continue to improve the game.
Project 2: The Developmental Origins of ADHD

Principal Investigator: Joel Nigg, Ph.D.

We know the nutrition women experience before and during pregnancy has a lasting effect on their children’s vulnerability for developing certain chronic diseases. However, less understood is the influence of nutrition on the development of the brain and the important cognitive and behavioral abilities that depend on the brain’s development. Attention deficit/hyperactivity disorder (ADHD) is a neurodevelopmental condition thought to be influenced by prenatal events.

ADHD runs in families. Women with ADHD are at greater risk of having infants with similar behavioral outcomes and are more likely to eat poorly during pregnancy than women without ADHD. Joel Nigg, Ph.D., and his colleagues investigated two aspects of this problem in a pilot study of 26 pregnant women with high scores on an ADHD screen or a history of ADHD diagnosis.

First, they asked whether women with ADHD eat a healthier diet, evaluated by multiple interviews asking about food consumption over the past 24 hours, it would affect the temperament of their infants. For this question, they randomly assigned women to a dietary counseling intervention or supportive discussion. They found that the women with ADHD were about as likely to drop out of the dietary intervention as other populations, but when they completed the intervention they reported better moods. Further, when they completed the dietary intervention there was a trend for their infants to have more well-regulated temperament as evaluated by observational study of the infant at age six months.

Second, the team asked whether characteristics of maternal diet in general are related to infant brain or behavior development. At a six-month follow-up, investigators conducted extensive behavioral testing of infants, including a battery of challenge tasks designed to evaluate emotional regulation. To date, they see clear links between aspects of maternal diet and infant emotional regulation, as well as an association of maternal ADHD with more maternal inflammation, itself likely related to nutrition.

Investigators attempted an MRI scan of the infants while they were sleeping at some point during the first 30 days after birth. The analysis of the brain imaging data is still underway. The data are supporting a large program project grant to be submitted in 2015.

Project 3: The OHSU Pregnancy Exercise & Nutrition (PEN) Program

Principal Investigator: Linn Goldberg, M.D.

The OHSU Pregnancy Education & Nutrition (PEN) program is a team-based, behavioral intervention to prevent gestational diabetes, a disease that affects one out of every ten pregnancies in the U.S. and poses lifelong consequences for both the mother and her child.

Led by researcher Linn Goldberg, M.D., the PEN Program recruited 30 healthy women during their first trimester of pregnancy. The women were randomly divided into a control group and five-person intervention groups. The intervention groups went through 20 weekly peer-led sessions with scripted curriculum that included information about how a nutritious diet and physical activity during pregnancy could reduce excessive pregnancy weight gain and risk of gestational diabetes. Group sessions were augmented with additional information and individual goal tracking on a program website. Women enrolled in the PEN program also received a free five-month gym membership, stretch bands and a pedometer to help them reach their physical activity goals.

The objective was to assess the feasibility and outcomes of the PEN program in increasing fruit, vegetable and whole grain consumption, reducing sugar consumption, promoting regular physical activity and encouraging prenatal vitamin and Vitamin D supplement use among pregnant women.

Overall, women found the program to be helpful. All women involved agreed that the PEN Program was valuable for improving their health, and would recommend it to other pregnant women. The women found that the other members of their small weekly groups helped encourage them to have healthy eating habits. Women in the PEN program gained less weight than women in the control group. They also reported increased consumption of fruit and grains between the first and third trimesters compared to the control group, as well increased use of Vitamin D supplementation and regular physical activity.

The program will be included as part of OHSU’s Healthy Team Healthy U challenge, a set of programs designed to help OHSU employees learn about and achieve a healthy lifestyle using a team-based approach. The researchers have applied for funding from the National Institutes of Health to expand the program to additional populations.
Future Steps
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What’s Ahead

Clatsop/Astoria Maternal Partnership Study (CAMPS)
The Moore Institute and the OHSU Knight Cardiovascular Institute Center for Developmental Health are working together on the Clatsop/Astoria Maternal Partnership Study (CAMPS). This study is designed to explore aspects of the local environment that make it easier or more difficult for women of childbearing age to eat healthy. As part of the CAMPS project, community members in Clatsop County are participating in a PhotoVoice project that includes taking pictures of things that help them eat healthy as well as things that make it more difficult to eat healthy. Narratives are then developed for the photos, which can be exhibited for other community members, and used by investigators to better understand the environment when developing community interventions.

Collaborative Project with Alaska Scientists to Study Yup’ik Eskimo Pregnancies
Researchers with the Moore Institute are planning a collaborative research project with the University of Alaska, Fairbanks. The project will look at how a move away from subsistence diets to more westernized diets has affected the prevalence of chronic disease among the native Yup’ik tribe of Alaska. The study will look at the interaction between genetic and environmental risk factors and protective factors in this population.

Digital Hub Development
The Moore Institute is working with a strategic team of experts to design, develop and launch an online digital hub. This hub will serve as an online meeting space for compiling and sharing information related to the developmental origins of health and disease. It will support community advocacy, offer a variety of tools and tangible steps that can support a movement to change the U.S. food culture.

Engage Latino Community to Develop Culturally-Specific Nutrition Programs
The Moore Institute and the OHSU Knight Cardiovascular Institute Center for Developmental Health are working together to create Adelante con tu Salud – a health initiative aimed at reversing the trend of deteriorating health among Latino immigrants. Adelante con tu Salud will join with local organizations serving the Latino community to change the health of generations through partnership, knowledge and action.

Health Care Provider Education Committee
The newly formed Health Care Provider Education Committee is developing nutrition curriculum to educate physicians and providers who care for pregnant women as well as education pieces that can be shared with patients.
Join the Moore Institute as we create permanent, positive change through nutrition now and for future generations.

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