

**BIOGRAPHICAL SKETCH**

NAME: Emily Oken

eRA COMMONS USER NAME: EMILYOKEN

POSITION TITLE: Professor, Department of Population Medicine

**EDUCATION/TRAINING**

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date	FIELD OF STUDY
Princeton University, Princeton NJ	AB	6/1991	Classics
Harvard Medical School (HMS), Boston MA	MD	6/1996	Medicine
Harvard Combined Medicine/Pediatrics Residency		6/2000	Medicine/Pediatrics
Harvard School of Public Health, Boston MA	MPH	6/2003	Clinical Effectiveness
HMS Fellowship in General Medicine and Primary Care, Boston MA		6/2003	General Medicine

**A. Personal Statement**

I am a physician trained in internal medicine and pediatrics and a Professor of Population Medicine (DPM at Harvard Medical School as well as in the Department of Nutrition at the Harvard TH Chan School of Public Health. I have contributed substantially to research education and mentorship. As detailed below, I am internationally recognized for my investigations into the long-term health effects of nutrition and environmental exposures, with a focus on the peripartum period. I have been PI of 6 R01 grants, many based in Project Viva, a pre-birth cohort of mothers and children that I have co-led since 2008, as well as a recently awarded UG3. I have also been substantial co-investigator on many others, including several based in longitudinal cohort studies commencing in pregnancy and an observational study of environmental factors predicting weight change and metabolic risk in the DPP study. I have also led a successful pilot RCT intervening on diet in pregnancy. I have published well over 100 peer-reviewed publications in high impact journals, presented numerous invited talks, and served on committees to develop maternal nutrition guidelines both nationally and internationally.

**B. Positions and Honors****Positions and Employments**

1996-2000 Clinical Fellow in Internal Medicine and Pediatrics, Massachusetts General Hospital, Boston MA  
2000-2015 Associate Physician in Medicine, Brigham and Women's Hospital, Boston MA  
2003-2006 Instructor of Ambulatory Care and Prevention, Harvard Medical School (HMS), Boston MA  
2007-2010 Assistant Professor of Population Medicine, HMS  
2010-2015 Associate Professor of Population Medicine, HMS  
2012- Site Director, Harvard General Medicine Fellowship, Department of Population Medicine, HMS  
2012- Director of Faculty Development, Department of Population Medicine (DPM), HMS  
2012-2015 Society Research Fellow, Peabody Society, HMS  
2014-2016 Associate Professor in the Department of Nutrition, Harvard Chan School of Public Health  
2015- Associate Director and Advisor, Oliver Wendell Holmes Society, HMS  
2015- Professor of Population Medicine, HMS  
2016- Professor in the Department of Nutrition, Harvard TH Chan School of Public Health  
2016- Director of the Division of Chronic Disease Research Across the Lifecourse (CoRAL) DPM/HMS

**Honors**

1988, 1990 Stanley J. Seeger Fellowship for study in Greece, Princeton University  
1991 J. Penrose Harland Prize for the best Classics department senior thesis, Princeton University  
1991 *Magna cum laude, Phi Beta Kappa*, Princeton University  
1994 Paul Dudley White Fellowship for study in international medicine, HMS  
1994 William Haddon Jr. Prize for Top Student Paper on Injury, Southern CA Injury Research Council  
1996 Robert H. Ebert Prize in primary care medicine, HMS  
1996 Dr. Bemy Jelin Award for international health care, HMS  
1996 *cum laude*, HMS

2005	Scan Design Fellowship for research in Denmark, Inger and Jens Bruun Foundation
2009	Rising Star Award, Society for Pediatric and Perinatal Epidemiologic Research (SPER)
2011	Young Mentor Award, HMS
2014	Best poster, Obesity Special Interest Group, Experimental Biology annual meeting
2015	Best poster, Diabetes in Pregnancy Study Group of North America annual meeting
2017	A. Clifford Barger Excellence in Mentoring Award, HMS

**C. Contributions to Science.** A complete list of my published work is available at:  
<http://www.ncbi.nlm.nih.gov/myncbi/browse/collection/40539997/?sort=&direction=>

1. Investigations into the perinatal origins of obesity and cardio-metabolic risk. In the past few decades, animal experimental studies have proven that perturbations during sensitive periods of development cause lifelong, sometimes, irreversible health consequences. Using state-of-the-art epidemiologic approaches, I am recognized internationally for translation to human populations. One major stream of my research concerns perinatal factors that influence risk for obesity and related cardio-metabolic sequelae in the child.

- 1.1. Martin RM, Patel R, Kramer MS, Guthrie L, Vilchuck K, Bogdanovich N, Sergeichick N, Gusina N, Foo Y, Palmer T, Rifas-Shiman SL, Gillman M, Davey Smith G, **Oken E**. Effects of promoting increased duration and exclusivity of breastfeeding on adiposity and insulin-like growth factor-I at age 11.5 years: a randomized trial. *JAMA*. 2013 Mar 13;309(10): 1005-13. PMID: PMC3752893.
- 1.2. Martin RM, Patel R, Kramer MS, Vilchuck K, Bogdanovich N, Sergeichick N, Gusina N, Foo Y, Palmer T, Thompson J, Gillman MW, Davey Smith G, **Oken E**. Effects of promoting longer term and exclusive breastfeeding on cardiometabolic risk factors at age 11.5 years: a randomized trial. *Circulation* 2014 Jan 129(3):321-9. PMID: PMC3946966.
- 1.3. Perng W, Gillman MW, Fleisch AF, Michalek RD, Watkins SM, Isganaitis E, Patti ME, **Oken E**. Metabolomic profiles and childhood obesity. *Obesity*. 2014;22(12):2570-8. PMID: PMC4236243.
- 1.4. Hivert MF, Rifas-Shiman SL, Gillman MW, **Oken E**. Greater early and mid-pregnancy gestational weight gains are associated with excess adiposity in mid-childhood. *Obesity (Silver Spring)*. 2016 Jul;24(7):1546-53. PMID: PMC4968400.

2. Investigations on growth in early life. Prenatal and infant growth predict long-term health, and accurate assessment of growth is important. We used birth certificate data from all births in the US 1999-2000 to generate a nearly continuous, nationally representative reference for fetal growth at birth. This paper has been cited almost 400 times and remains one of the most 'Highly Accessed' publications in *BMC Pediatrics*. Subsequently, we used 15 years of birth certificate data to identify a recent decline in size at birth, a surprise given that mothers are larger now than ever and that birth weight had previously been increasing for many decades. We subsequently demonstrated that this trend was independent of trends in obstetric interventions. Ongoing work is focused on childhood health outcomes related to early life growth.

- 2.1. **Oken E**, Kleinman KP, Rich-Edwards J, Gillman MW. A nearly continuous measure of birth weight for gestational age using a United States national reference. *BMC Pediatr* 2003;3(1):6. PMID: PMC169185.
- 2.2. Donahue SMA, Kleinman KP, Gillman MW, **Oken E**. Trends in Birth Weight and Gestational Length Among Singleton Term Births in the United States: 1990-2005. *Obstetrics and Gynecology* 2010; Feb;115(2 Pt 1):357-64. PMID: PMC3219436.
- 2.3. Morisaki N, Esplin MS, Varner MW, Henry E, **Oken E**. Declines in birth weight and fetal growth independent of gestational length. *Obstet Gynecol*. 2013 Jan;121(1):51-58. PMID: PMC3977951.
- 2.4. Kramer MS, Martin RM, Bogdanovich N, Vilchuk K, Dahhou M, **Oken E**. Is restricted fetal growth associated with later adiposity? Observational analysis of a randomized trial. *AJCN* 2014 Jul;100(1):176-81. PMID: PMC4144097.

3. Maternal peripartum health. I have also led work focused on the peripartum period as a window into short- and longer-term maternal health outcomes. I led or supervised studies of associations between modifiable exposures and health outcomes for the mother in the peripartum period, such as risks for pre-eclampsia, gestational diabetes mellitus, and postpartum weight retention. More recent work has examined longer-term maternal cardiometabolic health outcomes in relation to perinatal predictors including pregnancy complications, gestational weight gain, and lactation.

- 3.1. **Oken E**, Patel R, Guthrie LB, Vilchuck K, Bogdanovich N, Sergeichick N, Palmer TM, Kramer MS, Martin RM. Effects of an intervention to promote breastfeeding on maternal adiposity and blood pressure at 11.5 years postpartum: results from the Promotion of Breastfeeding Intervention Trial (PROBIT), a cluster-randomized controlled trial. *AJCN* 2013 Oct;98(4):1048-56. PMID: PMC3778859.
- 3.2. Fleisch AF, Gold DR, Rifas-Shiman SL, Koutrakis P, Schwartz JD, Kloog I, Melly S, Coull BA, Zanobetti A, Gillman MW, **Oken E**. Air pollution exposure and abnormal glucose tolerance during pregnancy: The Project Viva cohort. *Environ Health Perspect*. 2014 Apr;122(4):378-83. PMID: PMC3984217.
- 3.3. Walter JR, Perng W, Kleinman KP, Rifas-Shiman SL, Rich-Edwards JW, **Oken E**. Associations of trimester-specific gestational weight gain with maternal adiposity and systolic blood pressure at 3 and 7 years postpartum. *Am J Obstet Gynecol*. 2015 Apr;212(4):499.e1-12. PMID: PMC4387018.
- 3.4. Eggleston EM, LeCates R, Zhang F, Wharam JF, Ross-Degnan D, **Oken E**. National Patterns and Predictors of Post-Partum Glycemic Screening in Women with a History of Gestational Diabetes. *Obstetrics and Gynecology* 2016 Jul;128(1):159-67. PMID: In Progress.

4. Investigations into the harms and benefits of maternal prenatal fish consumption. Fish consumption during pregnancy may confer health risks because of methylmercury exposure but also benefits because of the many nutrients in fish, including omega-3 polyunsaturated fatty acids. Furthermore, the multiple, often competing, perspectives make optimal public health guidance on fish consumption an especially thorny challenge. To inform this issue, I have led observational analyses, authored a number of reviews and editorials, and conducted a qualitative study and pilot randomized trial, which for the first time demonstrated that pregnant women can act on advice to increase fish and n-3 fatty acid intake without a concomitant increase in their mercury intake. My work on prenatal fish consumption has influenced national recommendations for fish consumption. Policy makers at the US Food and Drug Administration, Environmental Protection Agency, and the World Health Organization have incorporated these results into ongoing risk-benefit calculations and guidelines. My work is frequently cited in critical reviews of the subject.

- 4.1. **Oken E**, Kleinman KP, Berland WE, Simon SR, Rich-Edwards JW, Gillman MW. Decline in fish consumption among pregnant women after a national mercury advisory. *Obstet Gynecol* 2003;102(2):346-51. PMID: PMC1989666.
- 4.2. **Oken E**, Wright RO, Kleinman KP, Bellinger D, Amarasiriwardena CJ, Hu H, Rich-Edwards JW, Gillman MW. Maternal fish consumption, hair mercury, and infant cognition in a U.S. Cohort. *Environ Health Perspect* 2005;113(10):1376-80. PMID: PMC1281283.
- 4.3. Bloomington A, Guthrie LB, Price S, Wright RO, Platek D, Haines J, **Oken E**. A qualitative study of fish consumption during pregnancy. *Am J Clin Nutr* 2010 Nov;92(5):1234-40. PMID: PMC3131842.
- 4.4. **Oken E**, Choi AL, Karagas MR, Mariën K, Rheinberger CM, Schoeny R, Sunderland E, Korrick S. Which Fish Should I Eat? Perspectives Influencing Fish Consumption Choices. *Environ Health Perspect*. 2012 Jun;120(6):790-8. PMID: PMC3385441.

5. Investigations into other nutritional and environmental predictors of childhood cognition. My research has also examined perinatal predictors of child cognitive development in addition to fish consumption. I have studied nutritional exposures, including maternal dietary intake of methyl donor nutrients (e.g. folate, choline) and of breastfeeding, as well as thyroid function. More recent work is now focusing on environmental chemical exposures including per and polyfluoroalkyl substances (PFASs) and traffic related pollution.

- 5.1. **Oken E**, Braverman LE, Platek D, Mitchell ML, Lee SL, Pearce EN. Neonatal thyroxine, maternal thyroid function, and child cognition. *J Clin Endocrinol Metab* 2009; 94(2):497-503. PMID: PMC2646520
- 5.2. Boeke CE, Gillman MW, Hughes MD, Rifas-Shiman SL, Villamor E, **Oken E**. Choline intake during pregnancy and child cognition at age 7 years. *American Journal of Epidemiology*. 2013;177(12):1338-47. PMID: PMC3676149.
- 5.3. Belfort MB, Rifas-Shiman, SL, Guthrie LB, Bellinger D, Taveras EM, Gillman MW, **Oken E**. Infant feeding and childhood cognition at ages 3 and 7 years: effects of breastfeeding duration and exclusivity. *JAMA Pediatrics*. 2013;167(9):836-44. PMID: PMC3998659.
- 5.4. Harris MH, Gold DR, Rifas-Shiman SL, Melly SJ, Zanobetti A, Coull BA, Schwartz JD, Gryparis A, Kloog I, Koutrakis P, Bellinger DC, White RF, Sagiv SK, **Oken E**. Prenatal and Childhood Traffic-Related Pollution

**D. Research Support**  
**Ongoing Research Support**

K24 HD069408 (Oken, PI) 07/1/2011 - 06/30/2017 (NCE)

Patient-Oriented Research in Maternal Perinatal Overnutrition and Child Adiposity

The overall goals of this K24 application will be to provide Emily Oken MD, MPH with protected time to serve as a mentor to junior clinician investigators, and to support new scientific aims that will build upon Dr. Oken's established work on the lifecourse health effects of maternal perinatal health and nutrition.

R01 HD034568 (Gillman -> Oken PI 7/1/16 – 1/31/2017) 03/22/2012 – 01/31/2017

Pre- and Peri-natal Predictors of Childhood Obesity

The overall goal of this is to examine associations of hormone levels in umbilical cord blood, gains in weight and adiposity in childhood, adiposity-related inflammation, DNA methylation, and cardiometabolic outcomes in early adolescence.

R01 ES21357 (Baccarelli & Wright, PIs) (Role: Site PI) 09/18/2012-07/31/2017

PROGRESS: BPA, Phthalates & Stress: Mechanisms and Interactions for Childhood Obesity

Using data from an ongoing pre-birth cohort study in Mexico City, we will examine associations of prenatal exposure to bisphenol A (BPA) and phthalates with disrupted maternal-fetal hypothalamic pituitary adrenal (HPA) axis function and with child adiposity, insulin resistance, and other cardiometabolic outcomes.

R01 ES21447 (Sagiv, PI) (Role: Site PI) 09/01/2012-08/31/2017

Prenatal Exposure to polyfluoroalkyl chemicals (PFCs) and child growth and development

The main objective of this study is to investigate the association between prenatal polyfluoroalkyl chemicals (PFCs) exposure and growth and neurodevelopment in children using data from the Project Viva cohort.

R01AI102960 (Oken, Gold PIs) 06/20/2013-05/31/2018

The Fetal and Childhood Environment, Oxidative Balance, Inflammation and Asthma

Fetal life exposures to dietary antioxidants and modifiable sources of oxidative stress (overweight, cigarette smoke, traffic pollution or acetaminophen) may have long-term effects on risk of these diseases, and risk may be further reduced or amplified by later childhood exposures. By defining the longitudinal progression of epigenetic, inflammatory, and heterogeneous clinical respiratory responses to modifiable exposures influencing oxidative balance, this study will make a unique contribution to development of strategies for prevention and targeted treatment of asthma and allergic disease.

R01 ES024765 (Oken, Horton, PIs) 12/01/2014- 11/30/2019

Longitudinal Association of PFCs with Obesity, Diabetes, and Metabolic Syndrome

We propose to evaluate longitudinal associations of polyfluorinated and perfluorinated chemicals (PFCs) with detailed cardiometabolic risk measures among ~1000 participants enrolled in the Diabetes Prevention Program/Diabetes Prevention Program Outcomes Study (DPPOS).

14CRP20490354 | 14CRP20490186 (Hivert, PI) (Role: Co-Investigator/Mentor) 07/1/2014 – 06/30/2017 (NCE)  
AHA

Lifetime Study – Pilot: Building healthier lives, free of cardiovascular diseases across multiple generations

Our objective is to assess adoption by prenatal care team members and individual preferences of pregnant women in the use of technological tools included in interventions aiming to support healthful lifestyle to achieve appropriate gestational weight gain.

K23 HD074648 (Sen, PI) (Role: Mentor) 07/1/2013 – 06/30/2018

BMI-based prenatal vitamins to ameliorate oxidative stress in obese pregnancy.

The central hypothesis of this project is that obese pregnancy is characterized by an oxidant/anti-oxidant imbalance, which increases inflammation and adversely impacts maternal health and neonatal outcome. This hypothesis will be tested in a randomized controlled trial in obese pregnant women.

P23ES024803 (Fleisch, PI) (Role: Mentor) 07/1/15-06/30/2020  
Air Pollution Exposure during Pregnancy, Maternal Glycemia, and Offspring Growth  
This grant will to leverage data from two prospective longitudinal cohorts of mothers and children to examine prenatal exposure to ambient air pollution and indoor wood burning as risk factors for maternal hyperglycemia, restricted fetal growth, and childhood weight gain, as well as obesity-associated hormonal alterations.

P30 DK092924 (Schmittiel, PI) (Role: Site PI) 09/1/2016 – 08/31/2021  
The Health Delivery Systems Center for Diabetes Translational Research  
The HDS CDTR will maintain a robust network of investigators, clinicians and health care operational leaders supporting diabetes translational research within and across multiple institutions; support the mentorship of junior faculty interested in pursuing translational research careers in Type 2 diabetes prevention and care; serve as a national resource for under-resourced safety net clinics and hospital networks; and develop a strong research partnership with the Morehouse School of Medicine.

NIH/OD UG3OD023286 (Oken, Kleinman PI's) 9/21/2016-8/31/2018  
Using state of the art statistical methods, we will address the early life environmental exposures that, singly and as mixtures, influence the separate and co-evolution of obesity, asthma and related dysfunctions. We will refine exposure measures, characterize outcome trajectories, and disentangle confounding, mediation and moderation in associations of exposures with outcomes. We will also use agent based simulation models to identify optimal levers for effective intervention. We will contribute the data, measures, and methods we refine within our cohort to the larger Environmental Influences on Child Health (ECHO) collaborative enterprise.

**Completed Research Support (past 3 years)**

DPM Faculty Grant (Hivert, PI) (Role: Co-Investigator / Mentor) 05/31/2014 – 12/31/2014  
Lifetime Study - Supporting healthful lifestyle during and after pregnancy: Optimizing system-based and patient-centered approaches  
The objective of this study is to optimize the content and format of system-based and patient-centered intervention approaches to support women to adopt healthful behaviors during pregnancy using focus groups with clinical team members and pregnant women at Harvard Vanguard Medical Associates.

EPA RD83479801 (Koutrakis: Center Grant PI) (Role: Site PI) 12/16/2010 - 12/31/2015  
Air Pollution Mixtures: Health Effects across Life Stages  
The purpose of this project is to study the effects of urban air pollution on somatic growth, blood pressure and cognition, and on related intermediate inflammatory and endocrine outcomes in an ongoing pre-birth cohort from the Boston Metropolitan area. We will examine the effects of individual pollutants, mixtures and sources. We will also consider factors influencing vulnerability and susceptibility to pollution.

1R01 NR013945-01 (Baccarelli) (Role: Co-Investigator) 03/25/2013 - 01/31/2016  
Novel Epigenomic Biomarkers, Prenatal Risk Factors, and Childhood Obesity  
In this project, we seek to identify novel methylomic biomarkers on cord blood DNA that could be used to reconstruct at birth obesogenic fetal-life experiences and to profile risks of childhood obesity and related cardiometabolic phenotypes.

R01 HD050758 (Oken, Martin, PIs) 09/01/2011 - 06/30/2016  
Breastfeeding Promotion RCT: Adolescent Neurocognitive and Respiratory Function  
This study is based on the 15-year follow up of 17,046 healthy infants who participated in the Promotion of Breastfeeding Intervention Trial (PROBIT), a cluster RCT in Belarus. We will measure effects of the experimental breastfeeding promotion intervention on neurocognitive and respiratory function at 16 years.

P30 DK092924 (Schmittiel, PI) (Role: Site PI) 09/11/2011 – 08/31/2016  
HMORN UCSF Center for Diabetes Translational Research  
The HMORN UCSF Center for Diabetes Translational Research will actively foster and support translational research in diabetes within health care delivery systems affiliated with the HMO Research Network (HMORN) while developing new collaborations with publicly-funded healthcare systems in the State of California.