



UNIVERSITY OF HAWAI'I  

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CANCER CENTER

**Population Sciences in the Pacific Program  
Faculty Recruitment Seminar**

***Epigenetic predictors of breast cancer risk:  
a life course perspective***

**Thursday, (January 24, 2019)  
12:00 noon**



**Alexandra Binder, Ph.D.**

*Assistant Professor*

*Department of Epidemiology*

*UCLA Fielding School of Public Health*

*Los Angeles, CA*

**University of Hawai'i Cancer Center  
701 Ilalo Street  
Sullivan Conference Center**

Light refreshments to follow

## **Epigenetic predictors of breast cancer risk: a life course perspective**

### **Seminar Abstract:**

Epigenetic analysis has the capacity to advance our understanding of cancer etiology, and to identify informative biomarkers of exposure and disease. Dr. Binder's research has been guided by the theory that stimuli during critical exposure windows can shape adult disease susceptibility through stable modifications to gene regulation. In this lecture, Dr. Binder will outline salient methodological considerations to identify determinants of epigenetic variation in observational human studies. She will detail her investigations into the relationships between specific patterns of DNA methylation and early life predictors of breast cancer risk. Broadly, her research indicates that epigenetic patterns are hormonally responsive, and may play a key role in programming the impact of reproductive history on breast cancer incidence. Dr. Binder will describe how these investigations motivate her current NCI-funded appraisal of whether an epigenetic estimate of biological age can improve breast cancer risk models and inform prevention strategies.

### **Biography:**

Dr. Binder is an Assistant Professor of Epidemiology at the UCLA Fielding School of Public Health, with expertise in epidemiologic methods, biostatistics, and computational biology. Dr. Binder's academic career has highlighted a commitment to engaging cross-disciplinary perspectives and guiding the appropriate conduct of epigenetic epidemiology studies. Her research applies cutting-edge epidemiologic and statistical techniques to investigate the epigenetic programming of cancer risk across the life course.

## Curriculum Vitae

**Date Prepared:** 12/21/18  
**Name:** Alexandra M. Binder  
**Office Address:** 650 Charles E Young Dr S, Los Angeles, CA 90024  
**Work Phone:** 310-825-5785  
**Work Email:** abinder@ucla.edu  
**Work FAX:** 310-206-6039  
**Place of Birth:** New York City, NY, USA

### Education

2011-2014	Sc.D.	Epidemiology (Dr. Karin Michels)	Harvard School of Public Health
2009-2011	M.S.	Epidemiology (Dr. Alkes Price)	Harvard School of Public Health
2005-2009	B.A. Honors, <i>cum laude</i>	Biology	Scripps College

### Postdoctoral Training

01/2015- 10/2015	Research Fellow	Biostatistics and Computational Biology Department (Dr. Rafael Irizarry)	Dana Farber Cancer Research Institute
11/2014- 10/2015	Research Fellow	Epigenetic Epidemiology (Dr. Karin Michels)	Harvard Medical School
11/2014- 10/2015	Postdoctoral Research Fellow	Epigenetic Epidemiology (Dr. Karin Michels)	Brigham and Women's Hospital

### Faculty Academic Appointments

06/2016-	Assistant Professor In-Residence	Department of Epidemiology	UCLA Fielding School of Public Health
10/2015- 06/2016	Instructor	Department of Obstetrics, Gynecology and Reproductive Biology	Harvard Medical School

### Other Professional Positions

2014-	Research Fellow	Instituto de Nutrición y Tecnología de los Alimentos; University of Chile. Santiago, Chile	
2014	Visiting Fellow	MRC Integrative Epidemiology Unit; University of Bristol. Bristol, UK	

## **Major Administrative Leadership Positions**

2015	Course Co-Director	Social and Behavioral Epigenetics: Study Design and Analysis University of Florida. Gainesville, FL
2014	Course Co-Instructor*	Epigenetic Epidemiology University of Bristol. Bristol, UK <i>*Multiple instructors helped design and organize course content</i>

## **Committee Service**

2018-	Member	Epidemiology Doctoral Written Qualifying Exam Committee, Fielding School of Public Health, UCLA
2018-	Member	Epidemiology Curriculum Committee, Fielding School of Public Health, UCLA
2017-2018	Member	Undergraduate Programs Committee, Fielding School of Public Health, UCLA
2017-2018	Chair	Epidemiology Admissions Committee, Fielding School of Public Health, UCLA
2017-	Member	FEC Evaluation Committee, Fielding School of Public Health, UCLA
2017	Member	Epidemiology Faculty Search Committee, Fielding School of Public Health, UCLA
2009-2013	Member	Student Advisory Council, Department of Epidemiology, Harvard School of Public Health. Ombudsman between students and faculty

## **Professional Societies**

2017-	Member	Jonsson Comprehensive Cancer Center, UCLA
2015-	Member	Society for Pediatric and Perinatal Epidemiologic Research
2013-	Member	Society for Epidemiologic Research
2012-2016	Member	DNA Methylation Working Group Monthly meeting of students, postdoctoral fellows, faculty, and research clinicians from across the Longwood Medical Area to discuss innovations and challenges in our field and provide feedback on current projects
2011-2014	Member; Organizer 2012	Reproductive, Perinatal, and Pediatric Epidemiology Journal Club, Epidemiology Department, Harvard School of Public Health

## **Ad hoc reviewer**

International Journal of Epidemiology, PLoS Medicine, Clinical Epigenetics, BMC Bioinformatics, PLoS ONE, Nature Methods

## **Report of Funded Projects**

### **Current**

08/2018-	Epigenetic age as a marker of reproductive age and modifier of invasive breast cancer risk among postmenopausal women National Cancer Institute, NIH K07CA225856 Principle Investigator <i>Epigenetic age is a significant predictor of cancer risk and all-cause mortality independent of chronological age. We will assess the impact of postmenopausal breast cancer risk factors on epigenetic aging, as well as evaluate the direct influence of epigenetic aging on invasive cancer incidence.</i>
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07/2018- Microbial and metabolic variations mediate the influence of childhood and adolescent EDC and trace element exposure on breast density  
Children's Health Exposure Analysis Resource (CHEAR), National Institute of Environmental Health Sciences, NIH 1977  
Co-Investigator  
*The overall objectives of our CHEAR study are to assess how exposure to endocrine-disrupting chemicals (phenols and phthalates), and trace elements (metals) measured in urine samples at Tanner stages 1 and 4 and 1 year post-menarche influence the pubertal microbiome and metabolome, and the potential impact on adolescent breast composition measured by DXA at Tanner stage 4 and 2 years post-menarche.*

01/2017- Interactive website to explore intra-individual variability in DNA methylation over time  
UCLA, High-Impact Data Initiatives  
Principle Investigator  
*The creation of an interactive website for investigators to explore the temporal variability in buccal cell DNA methylation across the genome to inform the design of future epigenetic studies & interpretation of results.*

## **Past**

2018 UCLA Clinical & Translational Science Institute  
National Center for Advancing Translational Sciences, NIH UL1TR001881  
KL2 Bridge Awardee  
*UCLA CTSI Institutional KL2 Bridge Award is specifically intended to help junior faculty who have submitted a NIH K award grant (mentored career development scientist award) and have received competitive scores on their proposal. This funding will support the faculty member and provide additional time for productivity.*

2015-2018 Environmental chemicals and postpubertal breast composition in a Latino cohort  
National Cancer Institute and National Institute of Environmental Health Sciences, NIH U01ES026130  
Epidemiologist and Biostatistician  
*This Breast Cancer and the Environment Research Program (BCERP) grant supports investigation into the influence of environmental chemicals on the risk of breast cancer throughout the lifespan. We are analyzing the influence of three endocrine disrupting chemicals, perfluorooctanoic acid (PFOA), butyl benzyl phthalate (BBP), and Zeranol, on adolescent female breast composition in an ongoing longitudinal cohort in Santiago, Chile.*

2012-2017 Predictors of mammary gland development and breast fibroglandular volume at puberty  
National Cancer Institute, NIH R01CA158313  
Postdoctoral Fellow  
*Investigate the influence of environmental and nutritional factors on putative early markers of breast cancer risk, specifically the onset of mammary gland development and volume of dense breast tissue, and possible mediation of the changes by epigenetic regulation.*

2015 US/UK joint workshop on social and behavioral epigenetics  
Division of Behavioral and Cognitive Sciences, NSF BCS-1448213  
2015 Workshop Organizer and Instructor  
*To organize research workshops bringing together influential members of the US and UK research communities involved in the integration of social and biological sciences, specifically social and behavioral epigenetics.*

- 2014 Research in chronic disease epidemiology and biostatistics  
Harvard School of Public Health Departments of Epidemiology and Biostatistics, Rose  
Traveling Fellowship  
Research Fellow  
*To investigate the molecular mechanisms of chronic disease in the Avon Longitudinal Study  
of Parents and Children using two-sample Mendelian Randomization.* (supervisors: Drs.  
Caroline Relton and George Davey-Smith)
- 2011-2014 Training grant in Reproductive, Perinatal and Pediatric Epidemiology  
National Institute of Child Health and Human Development, NIH T32HD060454  
Doctoral Student  
*Applying epigenetic epidemiology to elucidate the pathways by which adult disease  
susceptibility are influenced by environmental stimuli during critical periods of plasticity in  
fetal development.*
- 2008 Summer biomedical research at the University of Rochester Medical Center  
Strong Children's Research Center, Summer Internship Grant  
Research Fellow  
*To assess the utility of genetic analysis in the diagnosis of cystic fibrosis in patients with  
some clinical manifestations and indeterminate sweat chloride levels.*
- 2008 Cystic fibrosis research at the University of Rochester Medical Center  
Cystic Fibrosis Foundation, Student Traineeship Grant  
Research Fellow  
*To assess the utility of genetic analysis in the diagnosis of cystic fibrosis in patients with  
some clinical manifestations and indeterminate sweat chloride levels.*
- 2007 Summer fellowship for ecological research  
Keck Sciences Department for the Claremont Colleges, Mellon Fellows Award  
Research Fellow  
*Contributed to the ongoing survey of Nymphalid butterfly abundance and diversity at the  
Firestone Center for Restoration Ecology in Costa Rica as an indicator of habitat health  
following sustainable forestry efforts.*

## **Report of Local Teaching and Training**

### **Teaching of Students in Courses**

- 2018 *EPI 407A: Epidemiologic Research using R*  
Winter, This course broadly provides the R coding experience with an emphasis on data  
2018 Fall management, visualization, and analysis. Topics include data manipulation and simulation,  
model building and statistical inference, generation of publication suitable figures and  
tables, interactive graphics, an introduction to high-dimensional data analysis, and  
construction of functions and R packages.  
University of California, Los Angeles, CA  
ROLE: Instructor; fall/winter quarter course
- Epidemiology majors, otherwise consent 2 credits; 10 weeks, 2 hours per week lecture,  
of instructor; priority enrollment given to 1 hour laboratory; creating lectures, tutorials,  
epidemiology students; homework  
approx. 20 students

2018 Spring	<p><i>EPI 200C: Methods III: Analysis</i> Introduction to basic concepts, principles, and methods of epidemiologic data analysis. University of California, Los Angeles, CA ROLE: Instructor; spring quarter course</p> <p>Core epidemiology course; epidemiology majors, enforced requisites: 200A, 200B; approx. 65 students</p>	<p>6 credits; 10 weeks, 4 hours per week lecture, 2 hours laboratory; creating lectures, quizzes, exams, homework</p>
2011, 2012	<p><i>Introduction to Epidemiology</i> Introduction to the basic principles and methods used in epidemiologic research. Harvard Extension School. Cambridge, MA ROLE: Teaching assistant; fall semester course</p> <p>Continuing education for individuals interested in public health careers; approx. 70 students</p>	<p>15 weeks, approx. 8 hours per week, writing and grading homework and exams, addressing student questions in and out of office hours</p>
2006-2009	<p><i>Introductory Biology</i> W.M. Keck Science Department; Claremont McKenna College, Pitzer College, Scripps College. Claremont, CA ROLE: Lab teaching assistant; fall and spring semester course</p> <p>Required course for all science majors and premed students; approx. 20 students per semester</p>	<p>15 weeks per semester; 4 hours lab supervision and instruction per week, 3 hours grading per week</p>

**Laboratory and Other Research Supervisory and Training Responsibilities**

02/2017-06/2018	<p>Assist in supervision of postdoctoral fellow specialized in microbiome research. UCLA Fielding School of Public Health. Los Angeles, CA</p>	<p>Review grant proposals and manuscripts, guide study design and analysis for Dr. Leah Stiemsma</p>
02/2017-06/2017	<p>Assisted in supervision of Graduate Student Researcher. UCLA Fielding School of Public Health. Los Angeles, CA</p>	<p>Shaped and reviewed analysis plan, directed and oversaw statistical programming of Kristen Keller, Masters student in Depart. of Biostatistics (graduated June 2017)</p>
2010-2016	<p>Assisted in supervision of postdoctoral molecular biologist research, guided study design and analysis. Brigham and Women’s Hospital, Harvard Medical School. Boston, MA</p>	<p>Served as primary biostatistician and epidemiologist on projects with postdoctoral fellows: Dr. Tim Barrow, Dr. Amy Non, Dr. Jessica LaRocca, Dr. Benedetta Izzi, Dr. Milena Lesseur, Dr. William Accomando, Dr. Sanne van Otterdijk</p>

**Formally Mentored Graduate Students**

11/2018-	<p>Doctoral Committee Member</p>	<p>Mingyan Zhang, Doctoral Candidate, Department of Epidemiology, UCLA Fielding School of Public Health. Los Angeles, CA. “Marijuana Smoking, Genetic Polymorphisms, and Their Interactions on Risk and Survival of Lung Cancer and Upper Aerodigestive Tract Cancers”</p>
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09/2018-	Doctoral Committee Member	Diane Gu, Doctoral Candidate, Department of Epidemiology, UCLA Fielding School of Public Health. Los Angeles, CA. “DNA Methylation and Age-related HIV-associated Morbidity Dissertation Proposal”.
09/2017-	Doctoral Advisor	An-Chi Chen, Doctoral Student, Department of Epidemiology, UCLA Fielding School of Public Health. Los Angeles, CA.
08/2017-	Doctoral Committee Member	Kexin Jin, Doctoral Candidate, Department of Epidemiology, UCLA Fielding School of Public Health. Los Angeles, CA. “Hormonal Factors in Association to the Risk of Lung Cancer in Asian Women”.

### **Local Invited Presentations**

2018	Guest Instructor	<i>Introduction to Pre-processing and Analyzing Epigenetic Data</i> EPI 243 – Molecular Epidemiology of Cancer Department of Epidemiology, UCLA Fielding School of Public Health. Los Angeles, CA
2017	Guest Instructor	<i>Initiating and Organizing an Epigenetic Epidemiology Study</i> EPI 292 - Epidemiology Department Doctoral Seminar Department of Epidemiology, UCLA Fielding School of Public Health. Los Angeles, CA
2016	Guest Instructor	<i>Epigenetic Epidemiology</i> EPI 200A - Methods I: Basic Concepts and Study Designs Department of Epidemiology, UCLA Fielding School of Public Health. Los Angeles, CA
2016	Invited Speaker	<i>The Influence of Body Size and Epigenetic Programming on the Timing of Breast Development</i> Obstetrics and Gynecology Research Retreat, Brigham and Women’s Hospital. Boston, MA
2014	Invited Speaker	<i>Impact of Gestational Diabetes on Genome-wide Patterns of DNA Methylation in the Placenta</i> A Life-Course Approach to Women's Health, Harvard School of Public Health. Boston, MA
2012	Invited Speaker	<i>The Causal Effect of Red Blood Cell Folate on Genome-wide Methylation in Cord Blood: A Mendelian Randomization Approach</i> Challenges of Epigenome-wide Association Studies –Analytic Methods to Identify Important DNA Methylation Marks, Radcliffe Institute for Advanced Study, Harvard University. Cambridge, MA
2012	Invited Speaker	<i>The Causal Effect of Red Blood Cell Folate on Genome-wide Methylation in Cord Blood: A Mendelian Randomization Approach</i> Reproductive Health Symposium, Harvard School of Public Health. Boston, MA



# Report of Regional, National & International Invited Teaching/Presentations

## Invited Presentations and Courses

### National

2019 (impending)	Invited Speaker	<i>Epigenetic Predictors of Pubertal Timing</i> Session – Epigenetics: Bridging Cultural and Biological Anthropology American Association of Physical Anthropologists Annual Meeting. Cleveland, OH.
2017	Invited Speaker	<i>Faster Ticking Rate of the Epigenetic Clock is Associated with Faster Pubertal Development in Girls</i> Breast Cancer and the Environment Research Program Annual Meeting November 2017. City of Hope, Duarte, CA
2017	Invited Speaker	<i>Data Analysis and Visualization for Epigenetic Epidemiology Studies</i> Department of Statistics, San Diego State University. San Deigo, CA
2016	Invited Speaker	<i>Epigenetic Epidemiology in Practice: Shifts in Placental Gene Regulation Associated with Gestational Diabetes</i> The Center for Better Beginnings Department of Pediatrics School of Medicine, University of California, San Diego, CA
2016	Invited Speaker	<i>Epigenetics in Epidemiology: Study Design and Analysis</i> Department of Epidemiology, UCLA Fielding School of Public Health. Los Angeles, CA
2016	Invited Speaker	<i>Capturing Meaningful Changes in Cord Blood DNA Methylation Associated with Maternal Folate Levels</i> FASEB SRC Folic Acid, Vitamin B12, and One-Carbon Metabolism Annual Meeting. August 2016. Steamboat Springs, CO
2015	Workshop*	<i>Social and Behavioral Epigenetics: Study Design and Analysis</i> University of Florida. Gainesville, FL (Course Instructor and Co-Director) <b>*Lectures and practical exercises over three 8 hour days</b>

### International

2017	Invited Speaker	<i>Epigenetic Predictors of Pubertal Development</i> Annual Symposium of the China-USA Research Center for Life Sciences on Interdisciplinary Research with Global Public Health November 2017. Beijing, China
2016	Invited Speaker	<i>The Placetomics Consortium: Investigating Determinants of Placental Epigenetic Patterns in Humans- Challenges and Opportunities</i> 5 <sup>th</sup> Conference on Prenatal Programming and Toxicity (pptox) November 2016. Kitakyushu, Fukuoka, Japan
2015	Lecture	<i>The Integration of Epigenetics into Epidemiologic Studies</i> Instituto de Nutrición y Tecnología de los Alimentos; University of Chile. Santiago, Chile

2014	Lecture	<i>Design and Analysis of Epigenetic Epidemiology Studies</i> University of Hasselt. Hasselt, Belgium
2014	Workshop*	<i>Epigenetic Epidemiology</i> University of Bristol, School of Social and Community Medicine. Bristol, UK (Course Co-Instructor) <i>*20 hours of lectures, practical exercises and group discussions over 3 days</i>

## **Report of Scholarship**

### **Google Scholar link and citations (Citations 578, h-index 10)**

<https://scholar.google.com/citations?user=lTHHqgwAAAAJ&hl=en>

### **Peer-Reviewed Publications**

#### **Published**

1. **Binder AM\***, Stiemsma LT\*, Keller K, van Otterdijk SD, Mericq V, Pereira A, Santos JL, Shepherd J, Corvalan C, Michels KB. Inverse association between estrogen receptor- $\alpha$  DNA methylation and breast volume in adolescent Chilean girls. *Clinical Epigenetics*. (Accepted – In Process)  
*\*authors contributed equally to this manuscript*
2. Leseva MN, Grand RJ, Klett H, Boerries M, Busch H, **Binder AM**, Michels KB. Differences in DNA methylation & functional expression in lactase persistent & non-persistent individuals. *Scientific reports*. 2018; 8(1):5649. PMID: PMC5884863.
3. **Binder AM**, Corvalan C, Calafat AM, Ye X, Mericq V, Pereira A, and Michels KB. Childhood and adolescent phenol and phthalate exposure and the age of menarche in Latina girls. *Environmental Health*. 2018; 17(1):32. PMID: PMC5883544.
4. **Binder AM**, Corvalan C, Mericq V, Pereira A, Santos JL, Horvath S, Shepherd J, Michels KB. Faster ticking rate of the epigenetic clock is associated with faster pubertal development in girls. *Epigenetics* 2018; 13 (1), 85-94. PMID: PMC583697.
5. **Binder AM**, Corvalan C, Pereira A, Calafat AM, Ye X, Shepherd J, Michels KB. Pre-pubertal and pubertal endocrine disrupting chemicals exposure and breast density among Chilean adolescents. *Cancer Epidemiology, Biomarker and Prevention* 2017 (Accepted – In Process)
6. Barault L, Amatu A, Siravegna G, Ponzetti A, Moran S, Cassingena A, Mussolin B, Falcomatà C, **Binder AM**, Cristiano C, Oddo D, Guarrera S, Cancelliere C, Bustreo S, Bencardino K, Maden S, Vanzati A, Zavattari P, Matullo G, Truini M, Grady WM, Racca P, Michels KB, Siena S, Esteller M, Bardelli A, Sartore-Bianchi A, Di Nicolantonio F. Discovery of methylated circulating DNA biomarkers for comprehensive non-invasive monitoring of treatment response in metastatic colorectal cancer. *Gut*. 2017; NIHMSID: NIHMS948637. PMID: PMC5897187.
7. van Otterdijk SD, **Binder AM**, Michels, KB. Locus-specific DNA methylation in the placenta is associated with levels of pro-inflammatory proteins in cord blood and they are both independently affected by maternal smoking during pregnancy. *Epigenetics*. 2017;12(10):875–885. PMID: PMC5788443.

8. Tserga A, **Binder AM**, Michels KB. Impact of folic acid intake during pregnancy on genomic imprinting of IGF2/H19 and 1-carbon metabolism. *FASEB*. 2017; 31(12):5149-5158. PMID: PMC5690385.
9. van Otterdijk SD, **Binder AM**, Szarc Vel Szic K, Schwald J, Michels KB. DNA methylation of candidate genes in peripheral blood from patients with type 2 diabetes or the metabolic syndrome. *PLoS One* 2017; 12: e018095. PMID: PMC5519053.
10. **Binder AM\***, Carmona JJ\*, Accomando WP\*, Hutchinson JN, Pantano L, Izzi B, Just AC, Lin X, Schwartz J, Vokonas PS, Amr SS, Baccarelli AA, Michels KB. Empirical comparison of reduced representation bisulfite sequencing and Infinium BeadChip reproducibility and coverage of DNA methylation in humans. *npj Genomic Medicine* 2017; 2:13. PMID: PMC5642382.  
*\*authors contributed equally to this manuscript*
11. LaRocca J, **Binder AM**, McElrath TF, Michels KB. First-trimester urine concentrations of phthalate metabolites and phenols and placenta miRNA expression in a cohort of U.S. women. *Environmental Health Perspectives* 2016; 124:380-387. PMID: PMC4786977.
12. **Binder AM**, LaRocca J, Lesueur C, Marsit CJ, Michels KB. Epigenome-wide and transcriptome-wide analyses reveal gestational diabetes is associated with alterations in the human leukocyte antigen complex. *Clinical Epigenetics*. 2015 Aug 5; 7(1):79. PMID: PMC4524439.
13. Barrow TM\*, Barault L\*, Ellsworth RE, Harris HR, **Binder AM**, Valente AL, Shriver CD, Michel KB. Aberrant methylation of imprinted genes is associated with negative hormone receptor status in invasive breast cancer. *International Journal of Cancer* 2015 Aug; 137(3):537-547. PMID: PMC4437845.  
*\*authors contributed equally to this manuscript*
14. **Binder AM\***, LaRocca J\*, McElrath TF, Michels KB. The impact of first trimester phthalate and phenol exposure on IGF2/H19 genomic imprinting and birth outcomes. *Environmental Research* 2014 Aug; 133:396-406. PMID: PMC4155603.  
*\*authors contributed equally to this manuscript*
15. Non AL, **Binder AM**, Kubzansky LD, Michels KB. Genome-wide DNA methylation in neonates exposed to maternal depression, anxiety, or SSRI medication during pregnancy. *Epigenetics* 2014 July; 9(7):964-972. PMID: PMC4143411.
16. Izzi B, **Binder AM**, Michels KB. Pyrosequencing evaluation of widely available bisulfite conversion methods: considerations for application. *Medical Epigenetics* 2014; 2: 28-36. PMID: PMC4058339.
17. **Binder AM**, Michels KB. The causal effect of red blood cell folate on genome-wide methylation in cord blood: A Mendelian Randomization approach. *BMC Bioinformatics* 2013 Dec 4; 14:353. PMID: PMC3879006.
18. Michels KB, **Binder AM**, Dedeurwaerder S, Epstein CB, Grealley JM, Gut Ivo, Houseman EA, Izzi B, Kelsey KT, Meissner A, Milosavljevic A, Siegmund KD, Bock C\*, Irizarry RA\*. Recommendations for the design and analysis of epigenome-wide association studies. *Nature Methods* 2013 Oct; 10(10):949-955. PMID: 24076989.
19. Non AL, **Binder AM**, Barault L, Rancourt RC, Kubzansky LD, Michels KB. DNA methylation of stress-related genes and LINE-1 repetitive elements across the healthy human placenta. *Placenta* 2012; 3(3):183-187. PMID: PMC3308680.

## **Under Review**

1. **Binder AM**, Corvalan C, Mericq V, Pereira A, and Michels KB. Shifts in the age of breast development associated with childhood phenol and phthalate exposure in a longitudinal cohort of Latina girls. *Reproductive Toxicology*.

## **In Preparation**

1. Leseva MN, **Binder AM**, Saffery R, Michels KB. Differential expression of miR138-1 in pre-eclampsia and limited epigenetic deregulation at the materno-fetal interface.
2. Michels KB, **Binder AM**, Keller K, Pereira A, Kim CE, Santos JL, Shepherd J, Corvalan C. Association between systemic inflammation and adolescent breast volume is driven by body size.
3. Michels KB, DeVivo I, Calafat AM, and **Binder AM**. In utero exposure to endocrine-disrupting chemicals and telomere length at birth.

## **Books/Textbooks**

1. Michels KB, **Binder AM**. Considerations for design and analysis of DNA methylation studies. In: Tost J, editor. *DNA methylation protocols 3<sup>rd</sup> Edition*. Springer
2. **Binder AM**. Natural methane flux and climate change. In: Morhardt E, editor. *Global climate change: summaries of the 2006–2007 scientific literature*. Claremont CA: Roberts Environmental Center Press; 2007. p. 37–50.

## **Thesis**

Binder AM (2014) *The Determinants of Perinatal Epigenomic Profiles (Doctoral Dissertation)*. Harvard School of Public Health, Boston, MA.

## **Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings**

(Last 4 Years)

1. **Binder AM**, Corvalan C, Mericq V, Pereira A, Santos JL, Horvath S, Shepherd J, Michels KB. Faster ticking rate of the epigenetic clock is associated with faster pubertal development in girls. *Breast Cancer and the Environment Research Program Annual Meeting, City of Hope, Duarte, CA*. November 16-17, 2017.
2. **Binder AM**, Corvalan C, Pereira A, Shepherd J, Michels KB. Pre-pubertal and pubertal endocrine disrupting chemicals exposure and breast density among Chilean adolescents. *Breast Cancer and the Environment Research Program Annual Meeting, City of Hope, Duarte, CA*. November 16-17, 2017.
3. Pereira A, **Binder AM**, Corvalan C, Michels KB, Mericq V. Environmental exposures and pubertal outcomes in Chilean children. *9th Copenhagen Workshop on Endocrine Disruptors, Copenhagen, Denmark, May 2-5, 2017*.
4. **Binder AM**, Corvalan C, Michels KB. Pediatric phthalate and phenol exposure profile and potential impacts on pubertal timing in Chilean girls. *NIEHS Environmental Health Science FEST Durham, NC, December 6-8, 2016*.
5. **Binder AM**, LaRocca J, Calafat AM, Michels KB. Sexually dimorphic influence of first trimester phthalate and phenol exposure on the regulation of genes implicated in metabolism and transport in

- human placenta. Society for Pediatric and Perinatal Epidemiologic Research, Denver, CO, June 15-16, 2015.
6. **Binder AM**, Corvalan C, Pereira A, Shepherd J, Michels KB. Impact of perinatal factors on breast development and breast density. 7th International Workshop on Breast Densitometry and Cancer Risk Assessment, San Francisco, CA, June 10-12, 2015.
  7. **Binder AM**, LaRocca J, Lesseur C, Marsit C, Michels KB. Epigenome-wide and transcriptome-wide analyses reveal gestational diabetes is associated with alterations in the *Human Leukocyte Antigen* complex. Epigenomics of Common Diseases, Cambridge, U.K., October 28-31, 2014.
  8. **Binder AM**, LaRocca J, Michels KB. Impact of gestational diabetes on genome-wide patterns of DNA methylation in the placenta: preliminary results. A Life-Course Approach to Women's Health, Harvard School of Public Health, Boston, MA, January 23, 2014.
  9. **Binder AM\***, LaRocca J\*, McElrath TF, Michels KB. Comparisons of DNA methylation of H19 and IGF2 and first-trimester urinary phenol and phthalate biomarker concentrations. A Life-Course Approach to Women's Health, Harvard School of Public Health, Boston, MA, January 23, 2014.
  10. Izzi B, **Binder AM**, Barrow TM, Michels KB. Human placenta drives developmental plasticity through imprinting control. 8<sup>th</sup> World Congress on Development Origins of Health and Disease, Singapore, November 17-20, 2013.
  11. **Binder AM\***, LaRocca J\*, Calafat AM, Michels KB. Predicting phenol and phthalate biomarker profiles in first-trimester urines from two Boston-based prospective birth cohorts. Northeast Regional Chapter of the Society of Toxicology, 2013 Meeting, Cambridge, MA, September 27, 2013.
  12. **Binder AM\***, LaRocca J\*, Calafat AM, Michels KB. Predicting phenol and phthalate biomarker profiles in first-trimester urines from two Boston-based prospective birth cohorts. Northeast Regional Chapter of the Society of Toxicology, 2013 Meeting, Cambridge, MA, September 27, 2013.
  13. Izzi B\*, Carmona JJ\*, **Binder AM**, Just AC, Barupal J, Hutchinson J, Hofmann O, Schwartz J, Michels KB, Baccarelli A. Application of multiplexed reduced representation bisulfite sequencing (mRRBS) to environmental epigenetic studies: comparison to the 450k Illumina BeadChip. Joint ISEE, ISES, and ISIAQ Environmental Health Conference, Basel, Switzerland, August 19-23, 2013.
  14. **Binder AM** and Karin B. Michels. The causal effect of red blood cell folate on genome-wide methylation in cord blood: a Mendelian randomization approach. Society for Epidemiology Research, Annual Meeting, Boston, MA, June 18-21, 2013.