BIOGRAPHICAL SKETCHES OF KEY PERSONNEL

OMB No. 0925-0001 and 0925-0002 (Rev. 10/15 Approved Through 10/31/2018)

BIOGRAPHICAL SKETCH

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

NAME: Ryckman, Kelli Kae

eRA COMMONS USER NAME (credential, e.g., agency login): KRYCKMAN

POSITION TITLE: Professor of Epidemiology

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

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Iowa State University	BS	12/2003	Biochemistry
Vanderbilt University	MS	08/2008	Applied Statistics
Vanderbilt University	PhD	05/2009	Genetics
University of Iowa	NIH training grant	08/2010	Pediatrics

A. PERSONAL STATEMENT

I am a maternal-child health epidemiologist with expertise in statistics, genetics, and metabolomics. My research is focused on the epidemiologic, genetic and metabolic pathways that contribute to maternal and neonatal morbidity and mortality. Specifically, my research has identified epidemiologic, metabolic and genetic risk factors for pregnancy complications including preterm birth, preeclampsia and gestational diabetes. I direct the Iowa Perinatal Health Research Collaborative (IPHRC) an initiative to leverage population and hospital-level data on Iowa births to identify epidemiological and biological risk factors for adverse maternal-child health outcomes. The IPHRC includes a diverse range of stakeholders, including a patient advisory board, that span the fields of maternal-fetal medicine and form an interdisciplinary team for addressing research relevant to perinatal health. I also direct a HRSA-funded MCH Catalyst Training Program that is developing and providing maternal-child health curriculum for students in the College of Public Health.

B. POSITIONS AND HONORS

Positions and Employment

2003–2004 Research Technician, BioForce Nanosciences, Ames, IA

2009–2011 Postdoctoral Research Fellow, Department of Pediatrics, University of Iowa, Iowa City, IA

2011–2012	Associate Research Scientist, Department of Pediatrics, University of Iowa, Iowa City, IA
2011–2012	Assistant Research Scientist, Department of Pediatrics, University of Iowa, Iowa City, IA
2012–2016	Assistant Professor of Epidemiology, University of Iowa, Iowa City, IA
2014–2016	Assistant Professor of Pediatrics, University of Iowa, Iowa City, IA
2016-present	Associate Professor of Epidemiology and Pediatrics, University of Iowa, Iowa City, IA

Other Experience and Professional Memberships

2005–	Member, American Society of Human Genetics
2016–	Society of Epidemiologic Research
2016–	Society for Pediatric Research

Honors

2010	Health Science Research Week Poster Session Award from the Institute for Clinical and Translation Science
2012	The University of Iowa College of Public Health New Faculty Research Award
2014	The University of Iowa College of Public Health Junior Faculty Research Opportunity Award
2016	Society of Maternal Fetal Medicine – Best Platform Presentation in Session
2016-2017	State Hygienic Laboratory Environmental and Public Health Ambassador

C. Contribution to Science

1. My early publications during my graduate program focused on the genetics and epidemiology of reproductive disorders. Primarily, my research involved detecting genetic associations in inflammation-infection related genes with cervical cytokine concentrations. These publications led to a greater understanding of bacterial vaginosis, a serious and prevalent disorder of the lower genital tract associated with adverse pregnancy outcomes. Additionally, we demonstrated that immunological differences, driven by genetic factors, may partially explain the higher prevalence of bacterial vaginosis in African American women. I served as the primary data analyst and author on all of these studies under the supervision of my graduate student mentor Dr. Scott Williams.
   a. Ryckman KK, Williams SM, Krohn MA, Simhan HN. Racial differences in cervical cytokine concentrations between pregnant women with and without bacterial vaginosis. J Reprod Immunol. 2008 Jul;78(2):166-71. PubMed PMID: 18336917; PubMed Central PMCID: PMC2518392.
   b. Ryckman KK, Simhan HN, Krohn MA, Williams SM. Predicting risk of bacterial vaginosis: the role of race, smoking and corticotropin-releasing hormone-related genes. Mol Hum Reprod. 2009 Feb;15(2):131-7. PubMed PMID: 19131402; PubMed Central PMCID: PMC2734163.
   c. Ryckman KK, Williams SM, Krohn MA, Simhan HN. Genetic association of Toll-like receptor 4 with cervical cytokine concentrations during pregnancy. Genes Immun. 2009 Oct;10(7):636-40. PubMed PMID: 19554026; PubMed Central PMCID: PMC3164507.

2. The primary focus of my postdoctoral work in Dr. Jeff Murray's laboratory was on the genetic and metabolic contributions to pregnancy complications including preterm birth, preeclampsia, gestational diabetes, and low birth weight. I have continued this area of focus as an independent researcher and expanded the focus to also examining the associations between being born preterm and/or low birth weight and the impact on chronic disease later

in life. This research has led to several key publications, including two meta-analyses identifying lipid metabolism as a significant contributor to preeclampsia and gestational diabetes and several publications on the association between low birth weight and chronic disease. Additionally, these studies demonstrate that genetic factors play a strong role in preterm birth, preeclampsia and the risk of delivering an infant of low birth weight.

a. Spracklen CN, Smith CJ, Saftlas AF, Robinson JG, Ryckman KK. Maternal hyperlipidemia and the risk of preeclampsia: a meta-analysis. Am J Epidemiol. 2014 Aug;180(4):346-58. PubMed PMID: 24989239; PubMed Central PMCID: PMC4565654.
b. Ryckman KK, Rillamas-Sun E, Spracklen CN, Wallace RB, Garcia L, Tylavsky FA, Howard BV, Liu S, Song Y, LeBlanc ES, White MV, Parikh NI, Robinson JG. Ethnic differences in the relationship between birth weight and type 2 diabetes mellitus in postmenopausal women. Diabetes Metab. 2014 Nov;40(5):379-85. PubMed PMID: 24751988; PubMed Central PMCID: PMC4638122.
c. Smith CJ, Saftlas AF, Spracklen CN, Triche EW, Bjonnes A, Keating B, Saxena R, Breheny PJ, Dewan AT, Robinson JG, Hoh J, Ryckman KK. Genetic risk score for essential hypertension and risk of preeclampsia. Am J Hypertens. 2016 Jan;29(1):17-24. PubMed PMID: 26002928; PubMed Central PMCID: PMC4692983.

3. One of my primary focuses as an independent investigator is on understanding newborn screening profiles and their relationship to neonatal and childhood disease. To explore this research area I have worked with multiple State Departments of Health, including the Iowa Neonatal Metabolic Screening Program. Specifically, this work has led to the understanding that newborn screening profiles in preterm neonates can aid in the prediction of gestational age at birth and common complications of prematurity. We have shown from our work that amino acid levels are elevated in preterm neonates and in particular in those who develop respiratory distress syndrome and patent ductus arteriosus. I have served as the principal investigator on these studies.
   a. Ryckman KK, Cook DE, Berberich SL, Shchelochkov OA, Berends SK, Busch T, Dagle JM, Murray JC. Replication of clinical associations with 17-hydroxyprogesterone in preterm newborns. J Pediatr Endocrinol Metab. 2012;25(3-4):301-5. PubMed PMID: 22768660; PubMed Central PMCID: PMC3552557.
   b. Ryckman KK, Berberich SL, Shchelochkov OA, Cook DE, Murray JC. Clinical and environmental influences on metabolic biomarkers collected for newborn screening. Clin Biochem. 2013 Jan;46(1-2):133-8. PubMed PMID: 23010448; PubMed Central PMCID: PMC3534803.
   c. Ryckman KK, Berberich SL, Dagle JM. Predicting gestational age using neonatal metabolic markers. Am J Obstet Gynecol. 2016 Sep;214(4):515.e1-515.e13. PubMed PMID: 26645954; PubMed Central PMCID: PMC4808601.

4. My other primary focus is on identifying and understanding the relationships between maternal exposures and risk for preterm birth within large population-based cohorts. Specifically, I am focused on metabolic or immune related conditions that increase a woman's risk for PTB. We have a collection of studies using hospital discharge and birth certificate data from California that show dyslipidemia, rheumatoid arthritis and others are associated with an increased risk for preterm birth. We also we have begun to examine potential mediating effects that could explain some of the risk for PTB in these populations.
   a. Jelliffe-Pawlowski LL, Baer RJ, Blumenfeld YJ, Ryckman KK, O'Brodovich HM, Gould JB, Druzin ML, El-Sayed YY, Lyell DJ, Stevenson DK, Shaw GM, Currier RJ. Prediction of preterm birth with and without preeclampsia using mid-pregnancy immune and growth-related molecular factors and maternal characteristics. J Perinatology. 2018 Aug; 38(8):963-72. PubMed PMID: 29795450; PubMed Central PMCID: PMC6089890.

b. Smith CJ, Baer RJ, Oltman SP, Breheny PJ, Bao W, Robinson JG, Dagle JM, Liang L, Feuer SK, Chambers CD, Jelliffe-Pawlowski LL, Ryckman KK. Maternal dyslipidemia and risk for preterm birth. PLoS One. 2018 Dec;13(12):e0209579. PubMed PMID: 30576377; PubMed Central PMCID: PMC6303099.
c. Stouse JL, Donovan BM, Fatima M, Fernandez-Ruiz R, Baer RJ, Nidey N, Smith CJ, Bandoli G, Paynter R, Parikh N, Jelliffe-Pawlowski LL, Ryckman KK, Singh N. The impact of autoimmune rheumatic diseases on birth outcomes: A population-based study. RMD Open. 2019, in press.

Complete List of Published Work in My Bibliography:
http://www.ncbi.nlm.nih.gov/myncbi/kelli.ryckman.1/bibliography/40706110/public/?sort=date&direction=ascending

D. RESEARCH SUPPORT

Relevant Research Support

University of California, San Francisco (UCSF7027075) Dr. Larry Rand (PI) 06/01/2016-05/30/2021
Donation to UCSF by Mark and Lynn Benioff
Title: UCSF Preterm Birth Initiative
The major goal of this initiative is to conduct transdisciplinary cell to society investigations of preterm birth and work to reduce incidence and disparities in target locations. This grant does not overlap with the current proposal.
Role: Co-I (PI of subcontract)

HRSA 5880IP01 Dr. Steven Hunter (PI) 10/01/2019-09/30/2024
Title: State Maternal Health Innovation Program
The goal of this program is to improve maternal health outcomes in the State of Iowa by catalyzing multidisciplinary collaboration, collecting and analyzing maternal health data and promoting and executing innovation in maternal health service delivery and workforce development.
Role: Co-I

NICHD R03HD100708 Bao (PI) 12/01/19-11/31/21
Title: Epidemiological Study of Electronic Cigarette Use and Adverse Pregnancy and Birth Outcomes.
The objective of this project is to determine the potential health effects of electronic cigarette use before and during pregnancy on pregnancy complications and adverse birth outcomes. The long-term goal of this research is to improve maternal and child health across the lifespan.
Role: Co-I

PCORI EACC-18900 Ryckman (PI) 7/15/20-7/14/21
Title: Increasing Research Engagement and Capacity in PCOR/CER to Address Rural Perinatal Mortality and Morbidity
This purpose of the two-day conference is designed to convene PCORI funded research groups and multi-stakeholders including patients, providers and payers to accelerate perinatal depression PCOR/CER in rural communities.

HRSA Ryckman (PI) 6/01/20-5/30/25
Title: Training Maternal and Child Public Health Professionals to Address Growing Disparities in the Rural Midwest

The goals of the program are to educate graduate students in the foundations of lifecourse learning in Maternal-Child Health competencies through completion of through didactic coursework and research and practice-based experiences.

NICHD R01 HD102381 Ryckman (PI) 08/01/2020-04/30/2021
Title: Targeted metabolic profiling to predict major neonatal morbidity in very preterm newborns.
The purpose of this grant is to use metabolic screening measurements as biomarkers to predict neonatal morbidity in very preterm newborns
Role: PI

NICHD R03 HD102449 Lira (PI) 07/01/20-06/30/22
Title: Identifying Relationships between Late Premature Birth, Parental Factors, and Early Numerical and Spatial Development.
The purpose of this project is to examine numerical and special development in late premature infants and identify factors that are correlated with their development.
Role: co-I

Completed Research Support

K99/R00 HD065786 Dr. Kelli Ryckman (PI) 08/20/10-01/31/17
Title: Integrated Genomic and Metabolomic Profiles in Newborn Infants
This proposal investigates the genetic contribution to metabolic profiles in newborns. My role as PI is to oversee data collection and laboratory analysis, to supervise personnel and to participate in manuscript writing. Role: PI

R21 HD087864 Dr. Kelli Ryckman (co-PI) 04/01/16-03/31/19
Title: Newborn Metabolic Screening for Prediction of Childhood Respiratory Phenotypes
This project is centered on identifying early metabolic contributors to infant and childhood respiratory conditions including asthma. My role is to coordinate and conduct all aspects of the research with the co-PI at Vanderbilt University.
Role: co-PI with Dr. Tina Hartert at Vanderbilt University

NCI P30 CA086862-18S6 Dr. George Weiner (PI) 09/01/2018-08/31/2020
Title: Pregnancy outcomes in cancer survivors.
This project is a cancer center supported supplement that examines pregnancy outcomes in cancer survivors and the impact on neonatal metabolism.
Role: PI of the one-year supplement