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DATE RECEIVED: ***05/10/2024*** *DATE APPROVED:* ***05/10/2024***

FILE NUMBER: ***#24-042***

APPLICATION FOR STATISTICAL CONSULTING

LAST NAME**:** Dunn FIRST NAME: Erin

DEPARTMENT (full name): sociology CAMPUS MAILING ADDRESS: Morgan

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YOUR PRIMARY POSITION AT PURDUE: Faculty

Other:

(if a student) MAJOR PROFESSOR LAST NAME: FIRST NAME:

PHONE NUMBER:

MAJOR PROFESSOR CAMPUS ADDRESS (BLDG & DEPT):

MAJOR PROFESSOR EMAIL:

HOW DID YOU FIND US: Recommendation of a colleague

LIST STATISTICS COURSES TAKEN AND STATISTICAL COMPUTING EXPERIENCE: I have a ScD in epidemiology - so have taken advanced epidemiology and biostatistics courses

STAGE OF RESEARCH: Analysis (all data have been collected)

IF DESIGN STAGE IS COMPLETE, WAS A STATISTICIAN CONSULTED FOR DESIGN? Yes

PREVIOUS CONSULTANT – INSTITUTION/DEPARTMENT: Andrew Smith University of the West of England

ESTIMATED NUMBER OF CONSULTING HOURS NEEDED THIS SEMESTER: >15 hours

EXPECTED COMPLETION DATE OF PROJECT: 7/31/2024

IMPORTANT DEADLINE OR DUE DATES RELATED TO YOUR PROJECT: My grant ends 9/15/2024 - and I'm hoping the analyses to be run are completed by end of July so I can write-up the papers before the end of the grant.

THE RESULTS OF THIS RESEARCH WILL PROBABLY BE PUBLISHED AS:

Other

IS THIS RESEARCH SUPPORTED BY A GRANT OR CONTRACT? Yes

If so, give grant/contract title: Genomic and bioinformatic approaches for understanding the effects of childhood adversity on primary tooth formation and caries development in young children

GIVE A BRIEF DESCRIPTION OF YOUR RESEARCH INCLUDING:

PURPOSE:

Grant project summary is below. I am looking for someone to run analyses for Aim 2.

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This Short-Term Mentored Career Enhancement Award in Dental, Oral, and Craniofacial (DOC) Research for Mid-Career and Senior Investigators (K18) will provide the candidate

with the protected time to acquire the skills and knowledge to augment her research program to include DOC concepts. The PI is an established investigator who studies the genetic, epigenetic, and social-environmental determinants of depression, with a focus on the role of childhood adversity in early life. The PI has not yet received any formal training in dental development nor any DOC concept. She seeks short-term training to learn concepts and methods to measure tooth development and dental hard tissue phenotypes, which she will then use to achieve her career goal of studying the connections between tooth and brain development. Training will be overseen by mentor Dr. Mary L. Marazita, an internationally recognized expert in the genetics of caries and other DOC features, along with three senior advisors. Training will consist of coursework, on-line seminars, guided readings, conference attendance, and lab experiences at two sites (University of Kent and Calgary), which will provide training distinct from the PI's and mentor's home institutions. Training will also include a secondary analysis of a study from the Center for Oral Health Research in Appalachia (COHRA). Under one of COHRA's projects (R01-DE014899 PD/PIs Marazita, McNeil, Foxman, Shaffer) the COHRA2 longitudinal birth cohort was built and followed 1000 European-ancestry and 250 African American pregnant women from northern Appalachia. The PI will analyze existing data from COHRA2 to investigate the extent to which genetic factors and children's exposure to maternal distress, a common type of childhood adversity, associate with dental caries (tooth decay) and age at first tooth eruption. In Aim 1, the PI will use bioinformatics data on brain structures and disorders to calculate genetic risk scores capturing the aggregate effect of multiple genes (i.e., polygenic risk scores; PRS) and then examine their role on both dental caries risk and age at first tooth emergence. In Aim 2, the PI will use an analytic technique called the structured lifecourse modeling approach (SLCMA) to assess with repeated-measures data how the developmental timing of children's exposure to maternal distress (e.g., global and parenting stress; depressive symptoms) associates with number of dental caries and primary tooth eruption timing. Findings from this K18 may lead to the identification of new genes associated with dental caries and tooth formation timing, and increase knowledge on the role of maternal distress on these dental outcomes, which could then guide targeted preventive interventions. The proposed training experiences will ensure the PI learns concepts and measurement approaches to study tooth formation so she can more deeply integrate these concepts into her research. This K18 will also serve as the basis for an R01 proposal that will replicate and extend findings investigated here.

DESCRIPTION OF VARIABLES TO BE MEASURED:

B1. Methods for the Center for Oral Health Research in Appalachia's (COHRA2) dataset

B1.1. Study Overview, Sample, and Procedures. COHRA2 is a prospective, longitudinal birth-cohort examining the interplay of genetic, microbiological, environmental, and behavioral factors leading to early-life oral health disparities126,127. COHRA2 was developed in response to findings from the COHRA1 study, which revealed a high prevalence of dental caries in young children from families living in the Northern Appalachia region. COHRA2 includes 1,172 European-ancestry adult mother-child pairs who were recruited and enrolled prenatally, beginning in November 2011 for West Virginia-based mothers and January 2012 for Pennsylvania-based mothers and ending recruitment in 2017. Mothers were recruited through 42 partnering health and dental care offices, clinics, hospitals, and community centers, as well as other community sampling methods (e.g., radio and television ads, WIC offices, Head Start) across the state of West Virginia (n=555) and through one hospital and its associated clinics and offices in southwest Pennsylvania (n=617). Data have been collected on mothers and offspring through phone interviews, home visits, and in-person assessments. Phone interviews were conducted by a professional and HIPAA-compliant research survey service. 47 data collection periods have occurred there was ~10% attrition between each study visit. By age 5, 554 mother/child pairs were still in the longitudinal study out of the original 1,172 enrolled, representing 47% retention at that point, comparable to many similar studies worldwide1. There is slight variation in assessment measures and timepoints between the two sites, with the Penn site adding measures and measurement periods to the common protocol (See Table 1). These data can be combined, however, because the majority of timepoints are the same and we propose using the common timepoints for the overall analyses. We can also repeat analyses separately for the two sites to assess the congruence of results.

B1.2 Outcome Measures of Dental Caries and Tooth Eruption. Dental caries were assessed from age 2 months to 10 years during yearly intra-oral exams performed by a trained/licensed dentist or hygienist. Providers used the Decayed, Missing, or Filled Tooth Surfaces (DMFS) Index to evaluate the status of each primary tooth (e.g., decayed, healthy, restored) and surface, as part of the PhenX Toolkit Dental Caries Experience Prevalence Protocol. I will analyze the number of DMFS at age 5, the age before primary tooth exfoliation. Tooth eruption was assessed through the DMFS and phone interviews conducted every 6 months from 2 months of age to 10 years. Interviewers asked mothers if their child had any new teeth, how old the child was when their first tooth came in, and how many teeth the child has now. I will analyze the age (in months) at first tooth emergence.

B1.4. Exposure Measures of Maternal Distress. On up to 23 different measurement occasions (see Table 1), mothers reported their experiences of stressors and mental health symptoms commonly examined in studies of maternal distress74-84. These domains were measured using single items or well-known, psychometrically-sound, and standardized measures. With these data, we can characterize the effect of the developmental timing, accumulation, and recency of maternal distress on children's dental caries and age at tooth eruption. For example, depressive Symptoms were assessed using the Center for Epidemiological Studies of Depression Scale (CES-D), a 20-item self-report measure of current depressive symptoms132. CES-D items capture core symptoms of depression in the past week: anhedonia, depressed mood, and behavioral symptoms (e.g., felt depressed; sleep was restless; enjoyed life; had crying spells; felt sad; felt people disliked you). Dozens of studies report the CES-D has strong psychometrics, including in samples of women and mothers133,134.

RESEARCH QUESTIONS THAT YOU WANT TO ADDRESS USING STATISTICAL METHODS:

1. What is the relationship between maternal distress and childhood caries?

2. What is the relationship between maternal distress and age at tooth eruption?

STATISTICAL ISSUES:

I am a new faculty member transitioning to Purdue (see more details here: https://cla.purdue.edu/news/college/2024/dunn-release.html). My current data analyst is not transitioning to Purdue. As a short-term solution to wrapping up some of her work, I am hoping to identify someone at Purdue who can pick up where she left off to run these analyses for this project. The project is based on a mid/senior career training grant I have. These are all secondary analyses of an existing dataset. All variables have been coded, covariates have been derived, and there is extensive documentation about the project in a lab notebook and a draft of a methods section. I am hoping someone can wrap-up the analysis so my team can create tables/figures for the results and we can work to get the paper(s) submitted for publication before my grant comes to a close on September 15 2024.

ADDITIONAL INFORMATION YOU THINK WOULD BE HELPFUL:

ATTACHMENTS:

No Attachment