RUTGERS HEALTH
School of Health Professions

SHP Student Interns for Research and Scholarly Activities
Project Proposal Form

Instructions:

Please fill each box to the right of the required fields, obtain the required signature and return via email to Michele Sisco (mcoral@shp.rutgers.edu) by **March 24, 2025**.

If you are sending attachments, please ensure your contact information is added to all your forms.

Faculty Contact Information:

Date submitted:	March 27, 2025
Faculty Name:	Priyadarshini Kachroo
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Project Detail:

Project Title: (56 characters max)	Maternal nutrition during pregnancy and child lung health outcomes
Hypothesis:	We hypothesize that low serum folate levels, Vitamin D levels, and poor lipid profile in pregnant women are associated with a higher prevalence of asthma, wheezing, and reduced lung function development in children. These associations may be stronger in the low-income strata and socially disadvantaged groups.
Description: (Include design, methodology, data collection, techniques, data analysis to be employed, evaluation and interpretation methodology for research component)	**Design** The National Health and Nutrition Examination Survey (NHANES) is a cross-sectional survey conducted by the National Center for Health Statistics to provide national-level estimates of adults' and children's health and nutritional status (CDC). The study design will compare biomarker profiles in pregnant women and respiratory health outcomes in children within the same or adjacent survey cycles since NHANES does not provide direct longitudinal mother-child linkage data. This study will stratify population-level associations by demographic and socioeconomic factors to elucidate anecdotal evidence for identifying potential disparities among vulnerable subgroups. **Methodology** The relevant data extraction will be done from the NHANES datasets. The maternal cohort will comprise women in the reproductive age group, i.e., 18-45 years, who are pregnant. The

NHANES cycles will be selected based on the availability of details on antenatal serum folate levels, vitamin D levels, and lipid profiles.

The Children cohort will comprise of children aged 1-19 years. This cohort can be further stratified into 1-5 years for asthma/wheeze analysis and 6-19 years to assess for spirometry base lung function analysis. The data from the survey cycle containing all the above parameters will be extracted.

Key Variables that will be extracted from the dataset include:

- Maternal: Antenatal Serum Folate, Vitamin D, Lipid Profile
- Children: Diagnosis of Asthma, Wheezing, and Spirometry for lung function assessment
- Other: Socioeconomic variables such as Income, Race/ Ethnicity, BMI (optional) and Maternal Age (optional)
- Causal relationship in association with secondary maternal health outcomes could also be evaluated if available. For example: whether the effect of nutrition on child lung health is mediated through maternal conditions like pre-eclampsia

Data collection

The data will be extracted from the publicly available de-identified NHANES dataset. Relevant cycle data will be extracted depending on the availability of key variables in that survey cycle dataset.

Techniques

Data preparation will involve cleaning and filtering data using a Python and R environment. SQL will be used to merge the data sets if required. Visualizations for descriptive statistics will be curated using Python and R. Other data manipulation steps will be done as deemed necessary for analysis.

Data analysis

Descriptive statistics will include cohort summaries by demographic groups, comprising prevalence and nutritional levels. Visualizations such as bar charts, boxplots, and line graphs will be created where appropriate.

Inferential analysis, including logistic and linear regression, will be conducted to test binary (asthma/wheeze) or continuous outcomes (lung function) respectively for nutritional levels and child lung health outcomes. In addition, Subgroup analysis will be done to understand disparities across various demographic groups. Trend analysis could also be performed to compare the maternal biomarkers and child lung health outcomes across survey cycles.

Evaluation and interpretation methodology for the research component

The statistical interpretations will involve regression coefficient estimates (continuous outcomes) and odds ratios (binary outcomes) from regression models and p values to demonstrate the strength and direction of associations between variables. The regression

	models will help to test the nature of the association between dependent and independent variables. The implications from this research could help guide the nutritional policies around maternal health and identify any high-risk groups that are vulnerable to disparities since maternal health outcomes are linked to child health outcomes.
Specific Student Responsibilities:	Student responsibilities: • researching, developing, and interpreting the population-scale data in this project • testing and generating new hypothesis for scientific research from this epidemiological study design • contributing to scientific literature, abstracts, and presentations related to this project • completing any necessary trainings and participating in lab meetings relevant to research project
Start / end date of project:	May or June-July 2025

WHAT OTHER EDUCATIONAL OPPORTUNITIES ARE AVAILABLE TO STUDENTS? (e.g., journal club, seminars, clinic, rounds) WHERE DO YOU PLAN TO PRESENT OR PUBLISH THE FINDINGS WITH THE STUDENT? (e.g., national or state meetings, newsletter or journal, SHP poster day)	Journal club, SHP/external seminars, local or national conference presentations, learning new data analysis techniques

CHECK ALL APPROPRIATE BOXES BELOW AND PROVIDE REQUESTED INFORMATION.

This project is: ☐ clinical ☐ laboratory ☐ behavioral ☐ survey ☐ educational

☐ Other: please specify___Educational/Basic Epidemiological Research

☐ This project involves the use of human subjects (including chart review, retrospective studies and questionnaires).

Secondary Data Analysis using publicly available data

Pending ☐ Approved ☐ IRB Protocol Number _____

IRB approval must be obtained by June 2025

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Signature of Department Chair Date