

2008-R-07

CIO Name: National Center on Birth Defects and Developmental Disabilities

Project Title: Cardiometabolic risk factors among women of reproductive age

Project Description and Objectives:

There is a growing body of evidence suggesting that hyperglycemia during pregnancy can have a wide range of acute and long-term complications for both the mother and her offspring. In women with cardiometabolic risk factors such as diabetes and/or obesity there is an increase in insulin resistance which relates not only to glucose but also measures of lipid metabolism, thereby increasing nutrient availability to the fetus and an increased risk of obesity in childhood. Furthermore, maternal hyperglycemia during pregnancy is associated with increased recurrence of hyperglycemia in subsequent pregnancies and an increased risk of type 2 diabetes in the mother.

Among neonates of women with gestational diabetes or pregravid obesity there is a significant increase in fat mass but not in lean body mass as compared to weight-matched control infants. The increase in neonatal fat mass among neonates of women with gestational diabetes most likely relates to an abnormal intrauterine environment. Intrauterine exposure to an excess of fuels, such as hyperglycemia, early in pregnancy leads to an increased risk for birth defects, and later in pregnancy to an increased risk for greater birth weight and an increased risk for obesity, impaired glucose tolerance, hyperinsulinemia, dyslipidemia and hypertension in later life.

Obesity and diabetes have been increasing in prevalence in many parts of the world. These chronic conditions, along with other cardiometabolic risk factors such as hypertension, can lead to hyperglycemia, lipid disorders, and chronic inflammation that result in considerable costs to individuals and society because of the associated increased morbidity and mortality from cardiovascular diseases and other chronic disorders. Although cardiometabolic risk factors among pregnant women can be associated with adverse effects in their offspring and the trends in prevalence of obesity and diabetes suggest that

the prevalence of cardiometabolic risk factors among women of reproductive age might be increasing, information on the population-based prevalence of such factors, alone and in combination, among women of reproductive age is limited.

The research supported by this PEP aims to increase our knowledge of the prevalence of cardiometabolic risk factors among women of reproductive age, and to evaluate the risks for complications from cardiometabolic risk factors among their offspring.

The objectives of this research program are:

1. To examine cardiometabolic risk factors (e.g., diabetes, obesity, and hypertension) and determine the population-based prevalence of these cardiometabolic risk factors, separately and in combination, among women of reproductive age.
2. To examine the feasibility of evaluating the risks of short term complications and outcomes for the offspring (i.e., birth defects, preterm delivery, large for gestational age, small for gestational age, stillbirths, and perinatal mortality) from these maternal cardiometabolic risk factors using existing datasets and cohorts.

Awardee Activities: Research activities being sought to achieve the above objectives include the following:

1. Review the scientific literature on the prevalence of cardiometabolic risk factors among women of reproductive age and short-term complications among offspring of women with such risk factors; at least three risk factors should be examined: diabetes, obesity, and hypertension.
2. Identify potential data sources and/or study populations and develop an analytic plan to examine the prevalence of these risk factors and short-term complications. Data sources should include population-based surveys such as NHANES, BRFSS and existing cohort studies or databases from cohort studies in developed and/or developing countries.
3. Conduct analyses of the prevalence of cardiometabolic risk factors.
4. Preparation of reports and manuscripts for submission to peer-reviewed journals.

CDC Activities: CDC scientists will:

1. Provide information and access to an existing cohort

study conducted by CDC and Peking University Health Sciences Center.

2. Provide technical assistance in the development of the research methods for obtaining and analyzing survey and cohort study data.
3. Provide access to CDC experts on cardiometabolic risk factors and complications.
4. Participate in the interpretation of results and production of manuscripts.

Special Requirements: None

Additional Review Criteria: In addition to the standard review criteria used to evaluate the scientific and technical merit of research applications (Significance, Approach, Innovation, Investigators, and Environment) the following additional review criteria specific to this PEP will be considered in the review process:

1. Expertise in research related to cardiometabolic risk factors.
2. Experience with analysis of data from population-based surveys and epidemiologic studies, as evidenced by publications in the scientific literature.

Funding Preferences: None

Project Period Length: 1 year

Approximate Total Project Period Funding: \$150,000 (This amount is an estimate, and is subject to availability of funds and **includes direct and indirect costs, excluding the additional academic partner administrative costs.**)

Approximate Average Award: \$150,000 (This amount is for the first 12-month budget period, and **includes both direct and indirect costs, excluding the additional academic partner administrative costs.**)

Approximate Number of Awards: 1

NOTE: Applications must not exceed either the stated Project Period Length or the Approximate Total Budget Period funding per year. Applications in excess of these limits will be considered non-responsive and therefore will not be reviewed.