Title:   Effect of Animal Source Food Supplement Prior to and During Pregnancy on Birth Weight and Prematurity in Rural Vietnam

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Synopsis:
It has been known for over 80 years that maternal starvation reduces fetal growth and increases neonatal infections. Consequently, programs have been initiated to improve the fetal nutrient supply by providing food and/or micronutrient supplements to women after they become pregnant. The impact of these efforts has been disappointing. In developing countries, the prevalence of low birth weight (LBW) and infant mortality remain high. More recently, as a result of improved access to cereals following the 'green revolution,' nutritional concerns shifted from protein and energy to micronutrient deficiencies, especially those in animal-source foods (ASFs)—iron, zinc, vitamins A and B$_{12}$. But, infant deaths are still high in rural areas where the women suffer from malnutrition and deliver under-grown infants who are vulnerable to disease. The diets of these women are usually limited to rice and a few vegetables, and they lack key nutrients known to reduce preterm delivery, to support fetal growth, and to prevent infections leading to early deaths. Four of those essential nutrients for good pregnancy outcomes are iron, zinc, vitamin A, and vitamin B$_{12}$.

The well-established Vietnamese VAC system for supporting local production of fish, pork, poultry, and eggs by rural farms provides an opportunity to assess the impact of a food-based, micronutrient-rich supplement on pregnancy outcome in high-risk, rural Vietnamese women. Since maternal nutritional status at conception is strongly linked to pregnancy outcomes, we plan to compare the effect of consuming a micronutrient-rich, animal-source food (ASF) supplement from pre-conception to term with a supplement from mid-gestation to term on infant birth weight, prematurity rate, and infant growth during the first 6 months of life. Maternal nutritional status, anemia, and incidence of infections will also be measured. A total of 1044 women will be recruited from 174 villages at the time of registration for marriage and randomly assigned by village to one of three groups: I) ASF supplement (~150 kcal, ~14 mg iron, 5.2 mg zinc, 1100 µg RAE vitamin A, and 9 µg vitamin B$_{12}$) 5 days/wk from marriage to term (~13 months); II) ASF supplement 5 days/wk from 16 wks gestation to term (~5 months); or III) routine prenatal care. The ASF supplement, which will be made daily using local foods, will be designed to increase the woman’s intake of iron by 150%, zinc by 70%, and vitamins A and B$_{12}$ by 200% and 300%, respectively. Maternal dietary intakes, height, weight, mid-upper arm circumference, triceps and subscapular skinfold thickness, iron, zinc, vitamin A and B$_{12}$ status, and immune function will be measured at recruitment, 16, and 34 weeks gestation. Because of the potential impact of infections on fetal growth and maternal health postpartum, the incidence of infections [urinary tract infection (UTI), pneumonia, and diarrhea] will be assessed twice-monthly from 16 weeks gestation through six months postpartum by a standardized questionnaire administered by a health worker to all three groups in addition to a rapid evaluation of urine for infection. Infant weight, length, head, mid-arm, and abdominal circumference will be measured at birth, 2, 4, and 6 months.

This study will be the first to compare a food-based, micronutrient-rich supplement consumed prior to conception to term with one given only during pregnancy. Although it is recognized by many that pregnancy may be too narrow a window to improve maternal nutritional health, it is typical for micronutrient supplements to only be given from the time of enrolling for prenatal care to term.