OBJECTIVES

- To learn importance of monitoring at risk prenatal women for exposure to lead per CDC recommendations
- To learn history of studies compiled by lead and pregnancy work group as evidence for monitoring
- To obtain tools needed for assessments and follow up practices
- To disseminate information in the workplace and provide to other providers

PRENATAL LEAD TESTING

NORTH CAROLINA STATE LABORATORY OF PUBLIC HEALTH

GUIDELINES FOR THE IDENTIFICATION AND MANAGEMENT OF LEAD EXPOSURE IN PREGNANT AND LACTATING WOMEN

HTTP://WWW.CDC.GOV/NCEH/LEAD/PUBLICATIONS/LEADANDPREGNANCY2010.PDF

REASONS WHY PRENATAL SCREENING ARE IMPORTANT:

First, prenatal lead exposure has known influences on maternal health and infant birth and neurodevelopmental outcomes (Kelly & others 2008).

Second, bone lead stores are mobilized during periods of increased bone turnover such as pregnancy and lactation. Over 90% of lead in the adult human body is stored in bone (Barry 1975), but it may result in redistribution of cumulative lead stores from bone into blood during periods of heightened bone turnover, such as pregnancy and lactation (Gibbons & others 2003; Roberts & others 1995). Since bone lead stores persist for decades, women and their infants may be at risk for continued exposure long after exposure to external environmental sources has been terminated.

Finally, there is evidence that a significant number of pregnant women, and presumably their infants, are being exposed to lead in the United States today. It is clear that exposed subgroups do exist and some may be highly exposed, particularly recent immigrants,20 who practice certain behaviors, such as use of culturally-specific remedies and products, living near hazardous waste sites or active mines, and those receiving elder care.

Because no national recommendations exist, the Centers for Disease Control and Prevention (CDC) and state lead poisoning prevention programs are not able to consistently respond to concerns from medical providers about when to test pregnant or lactating women for lead exposure. In response to this need, the Lead and Pregnancy Work Group was convened in April 2004 by the CDC Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) to review the existing evidence.
IMPACT OF LEAD EXPOSURE ON SEXUAL MATURATION AND FERTILITY

Two studies have examined the outcome using cross-sectional data from the third MANNES (MINNESOTA) study. Lichtenstein et al. (1990) analyzed blood lead and pubertal development in boys aged 8-15 years of age. Blood lead levels of >1.5 µg/dL were associated with a 2- to 3-month delay in Tanner stage measurements (breast and pubic hair development) and increased in Mexican-American and African-American girls, while Non- Hispanic white girls experienced non-statistically significant delays in all pubertal measures.

Wang et al. (2003) found that higher blood lead levels were significantly associated with delayed attainment of menarche and pubic hair development, even after adjustment for race/ethnicity, age, family size, residency, income, and body mass index.

IMPACT OF LEAD EXPOSURE ON MATERNAL HYPERTENSION DURING PREGNANCY

Lead is an established risk factor for hypertension in adults (Krolewski and Craft 1993, Kemper et al. 2005). Hypertension is one of the most common complications of pregnancy. There is substantial evidence that lead damages the vascular endothelium (Vaziri and Sica 2004) and that endothelial dysfunction is an important mechanism of hypertension and preeclampsia in pregnancy (Kumamaru et al. 2006).

Associations have also been found between gestational hypertension and bone lead. Rothfeder et al. (2002) reported on a prospective cohort study of 1,066 women aged 16-44 years enrolled during their third trimester in south central Los Angeles. This study included postpartum measures of tibia and calcaneus bone lead in addition to maternal blood lead levels. They found that each 10 µg/g increase in calcaneus bone lead (range -30.6 to 49.9 µg/g) was associated with an almost two-fold increased risk for third trimester hypertension.

Blood lead levels as low as 3 µg/dL were associated with 2 to 6 month delays in Tanner stage measurements (breast and pubic hair development) and increased in Mexican-American and African-American girls, while Non-Hispanic white girls experienced non-statistically significant delays in all pubertal measures. Selevan et al. (2003) analyzed blood lead and pubertal development by race in girls ages 8-18 years of age. (ื่ืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืืื์ื์ื์ื์ื์์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื์ื้์ื์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื้์ื์ื้์ื์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื้์ื์ื์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื์ื้์ื์ื์ื์ื้์ื้์ื้์ื์ื้์ื้์ื้์ื้ifton