Case-Control Study: Birth Weight and Risk of Childhood Acute Lymphoblastic Leukemia

Frank D. Groves¹, Daniel J. Roberts¹, Brittany P. Taylor¹, Timothy C. Flood², and Thomas C. Tucker ³,⁴

(1) - Department of Epidemiology and Population Health, School of Public Health and Information Sciences, University of Louisville; (2) - Arizona Cancer Registry; (3) - Kentucky Cancer Registry; and (4) - Department of Epidemiology, College of Public Health, University of Kentucky.

BACKGROUND:
Cases-control and cohort studies among European populations have repeatedly implicated high birth weight as a risk factor for childhood leukemia. Recent literature on this topic has not always confirmed this finding. Studies in the United States have not always matched on race or adjusted for race. We used linked cancer-registry and birth certificate data from Arizona, Kentucky, and Illinois to conduct a case-control study, matching on demographic factors.

METHODS:
Cases of acute lymphoblastic leukemia (ALL) diagnosed among children under five years of age were abstracted from the cancer registries of these states: Arizona, Kentucky, and Illinois. Birth certificate data were abstracted for each case, and for a set of control birth certificates matched on sex, race, ethnicity, county of birth, and date of birth. The matching ratio (number of controls per case) ranged from 4:1 in Kentucky and Illinois to 6:1 in Arizona.

Using normal birth weight (2500-4000 grams) as the referent group, the odds ratios (OR) and 95% confidence intervals (CI) for childhood ALL among lighter and heavier newborns were calculated by conditional logistic regression (matched-sets analysis) using SAS PROCLISLOGISTIC.

RESULTS:
Compared with children of normal birthweight (2500-4000 grams), children whose birthweight exceeded 4000 grams had an elevated risk of acute lymphoblastic leukemia in the first five years of life (OR=1.154; 95% CI=(1.012, 1.316)). The excess risk in the entire population was driven by the substantial excess risk among non-Hispanic white children [OR=1.831; 95% CI=(1.631, 2.067)]; among African American children [OR=1.165; 95% CI=(0.982, 1.379)], and among “other” children [OR=1.307; 95% CI=(1.076, 1.588)].

DISCUSSION:
This study confirms the elevated risk of childhood ALL previously reported by other studies in children of European ancestry. The few studies that did not find such an association were conducted in more diverse populations, and either did not stratify by race or did not adequately adjust for it.

Matched-Pairs Odds Ratios (OR) for Acute Lymphoblastic Leukemia (ALL), with 95% Confidence Intervals (CI), by Conditional Logistic Regression: