LOW LEVEL RADIATION EFFECTS

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1. Introduction

The objectives of this paper are to set forth some of the questions and problems created by the recent epidemiological study of congenital malformations in New York State [1]. This study uncovered the existence of differences in congenital malformation rates in various areas of Upstate New York. The higher malformation rates were found to be primarily associated with geographical areas containing natural materials with relatively high concentrations of radioactive elements. The potential significance of these preliminary findings has set in motion a series of efforts to attempt to confirm and refine these data and to permit an appropriate interpretation. Interested readers are referred to the published material for additional details and illustrations.

2. New York State study

2.1. *Study design.* The epidemiological study in New York State was initiated to attempt to obtain an answer to why congenital malformation rates are relatively higher in some parts of the state than others. Early leads suggested that there might be an association between an increase in congenital malformations and the presence of increased quantities of natural materials with relatively high levels of natural radioactivity. This knowledge resulted in the setting forth of four basic study objectives:

(a) Determination of the incidence of congenital malformations reported on birth and death certificates by county, city, township and village,

(b) Determination of the type, amount and distribution of natural materials with relatively high concentrations of the radioactive elements,

(c) Determination of the association, if any, between the incidence of congenital malformations and the distribution of such materials, and

(d) Evaluation of the role which known teratogenics, including radiation, may have had in producing congenital malformations within relatively high and low malformation rate areas.

2.2. *Findings.* A tabulation was made of all congenital malformations recorded for children born during 1948–1955 in New York State, exclusive of New York City. There were 16,369 malformations among 1,242,744 live births, an incidence of 13.2 per 1,000 live births. For the rural area the rate was 13.5. Rates of 20.0 or higher occurred in 186 out of a total of 942 townships. Contiguous