

US EPA ARCHIVE DOCUMENT

# Pilot Study Evaluating Symptomatic Children for Organophosphate Pesticide Exposure

Start Date: 10/1998

Completion Date: 12/2004

## Project Purpose:

The purpose of this pilot study is to measure biomarkers of exposure in symptomatic children aged two to four years to estimate the prevalence of unrecognized pesticide-related illness. Despite the rapid metabolism of OP pesticides, if the illnesses are due to pesticide exposure, metabolites are likely to be present in the urine during the time that children exhibit symptoms. If pesticide exposure is found to be associated with illness in children, the specific symptoms and characteristics of the exposed children will be used to develop a high risk profile. This study will: (a) evaluate pediatric clinics as potential target populations for studies of pesticide exposure in young children; (b) estimate the burden of unrecognized pesticide-related illness in selected pediatric clinic populations; and (c) evaluate methods of biologic specimen collection in preschool children.

## Project Description:

This pilot study was conducted among eligible volunteers at cooperating pediatric clinics in Imperial County, California (Valley Family Health Care Centers and the Clinicas de Salud del Pueblo) during October and November 1999. A second phase study of data collection was conducted in 2000 in Central North Carolina. In both studies, parents were approached to determine eligibility and willingness to participate in the study while they are waiting to be seen in the clinic. Informed consent was obtained from parents who wanted to have their child participate. Parents were asked to assist in obtaining a urine sample from the child. A finger prick blood sample was also collected if the parent approved. In North Carolina, we also collected hand wipe samples in the clinic and made a home visit to collect housedust, handwipes and urine approximately two weeks after the clinic visit for most children.

Data from this pilot study included screening symptom information, demographic information about the child (age, gender, etc.), limited medical data collected at the patient visit (physician diagnoses for current illness, temperature, height and weight) and biomarkers of organophosphate pesticide exposure. Urine collected was analyzed by collaborators at the Centers for Disease Control for metabolites of a variety of organophosphates. Dried blood spots were analyzed for cholinesterase levels and related compounds by Dr. Stephanie Padilla of the Neurotoxicology Division of EPA. The data will be analyzed to estimate the prevalence of pesticide-related illness in this pediatric population, evaluate the use of pediatric clinics to find high risk preschool children, and assess the feasibility of biologic specimen collection in preschool children.

## Accomplishments:

- 10/99-11/99 - Field study conducted. Urine samples collected from 112 eligible children and blood spot samples from 106 of those children.
- Fall 2000 - Biomarker results to be returned to participants and physicians. Limited follow up of participants is planned.
- Summer 2000 – Second field study conducted. Clinic urine samples from 91 children, followup home visits completed for 68 households.
- 2003-4 – Final laboratory analyses completed.

## Expected Outcome(s):

This pilot project is expected to provide information that will be useful for planning future studies of pesticide exposure in preschool children. Information gathered in this project will fill important data gaps including estimating the prevalence of pesticide-related illness in this pediatric population, evaluating the use of pediatric clinics to find high risk preschool children, and assessing the feasibility of biologic specimen collection in preschool children.

Findings from these studies have been essentially negative. Clinical symptoms were not found to be useful in predicting urinary metabolite levels. Characteristics of the children (age, gender, etc.) were not predictive with the possible exception of diaper use. In the second phase pilot, children still in diapers had a slightly higher average urinary metabolite level, but this was not predictive in phase one. The majority of handwipe measures were below the limit of detection and housedust samples did not help predict urinary metabolites.

#### **Publications or Presentations:**

Mendola, P. Walsh, D.; Barr, D.; Needham, L.; Hilborn, E.; Hern, S.; Gonzales, M.; Roberston, G.; Rhoney, S.; Royster, M.; Carty C.; Creason J. Organophosphate pesticide metabolites in urine from preschool children with flu-like illnesses. Poster presented at the 14<sup>th</sup> Annual Meeting of the Society for Pediatric and Perinatal Epidemiologic Research, Toronto, Canada, June 2001.(Ped Perinatal Epi 2001; 15:A23) .

Mendola, P.; Walsh, D.; Barr, D.; Needham, L.; Hilborn, E.; Hern, S.; Gonzales, M.; Roberston, G.; Rhoney, S.; Royster, M.; Carty C.; Creason J. Organophosphate pesticide metabolites in urine from preschool children with flu-like illnesses. Paper presented at the 13<sup>th</sup> Conference of the International Society for Environmental Epidemiology, Garmisch-Partenkirchen, Germany, September 2001.

Carty, C.; Mendola, P.; Barr, D.; Needham, L.; Walsh, D. Residential pesticide use and urinary organophosphate metabolites in pre-school children. Poster presented at the 11<sup>th</sup> Conference of the International Society of Exposure Analysis, Charleston, SC, November 2001.

Baker, J.A.; Mendola, P.; Barr, D.; Walsh, D.; Creason, J.; Needham, L. Non-residential organophosphorus pesticide use as a predictor of children's urinary metabolite levels. Poster presented at the 14th Conference of the International Society for Environmental Epidemiology and the 12<sup>th</sup> Conference of the International Society of Exposure Analysis, Vancouver, Canada, August 2002.

Mendola, P.; Barr, D.; Walsh, D.; Hern, S.; Rhoney, S.; Needham, L.; Hilborn, E.; Gonzales, M.; Carty, C.; Robertson, G.; Creason, J. Can flu-like illness be an indication of recent organophosphate pesticide exposure in preschool children? Poster presented at the 17<sup>th</sup> Annual meeting of the Society for Pediatric and Perinatal Epidemiologic Research, Salt Lake City, UT, June 2004.

Mendola, P.; Barr, D.; Walsh, D.; Hern, S.; Rhoney, S.; Needham, L.; Hilborn, E.; Gonzales, M.; Carty, C.; Robertson, G.; Creason, J. Organophosphate pesticide exposures – Where are the high risk children? Discussion poster presented at the 16<sup>th</sup> Annual meeting of the International Society for Environmental Epidemiology, New York, NY, August 2004. (Epidemiol 2004; 15:S180-S181)

#### **Project Contacts:**

Pauline Mendola, EPA/ORD (919) 966-6953 [mendola.pauline@epa.gov](mailto:mendola.pauline@epa.gov)

#### **Participant(s):**

EPA/ORD, CDC/NCEH