EXPOSURE ASSESSMENT AND HEALTH EFFECTS ASSOCIATED TO PESTICIDES BURIED NEAR AN URBAN COMMUNITY IN COLOMBIA

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Background/aims: Organophosphate and organochlorine pesticides have been associated with neurological and respiratory effects in agricultural communities, but few studies have been conducted in buried pesticides deposited close to human settlements. An urban neighborhood and a school with >1,500 children was settled in a former agricultural area of 44ha in Cartagena-Colombia. During construction, several containers with pesticides were found. Contaminated soils and containers were removed and confined to an area close by. Our objective was to evaluate exposure to and potential health effects of these buried pesticides on surrounding communities.
Methods: Concentrations of pesticides in soil and air were determined. A health risk assessment was done modeling soil concentrations found at the pesticides confined area. Respiratory diseases data was obtained, and tests for pulmonary and neurological function were applied in children(n=389) and adults(n=440) at the exposed and a control area. Levels of pesticides in serum and their metabolites in urine were determined in a subsample of children.
Results: Presence of DDT isomers and metabolites were found in one soil sample and chlorpyrifos was reported in one air sample. Risk modeling suggests risk inside the confined area by different routes of exposure. Although individuals at the exposed area reported more frequently severe dyspnea(children OR:2.97; IC95%:1.0-8.97) and wheezing (adults OR:2.10; IC95%:1.13-3.90) evidence of lung function effects was not demonstrated by spirometry. There were not differences in intellectual performance. Pesticides in blood serum were mostly below detection limits, and only significant levels of pp-DDE were found, although at concentrations similar to non-exposed populations.
Conclusions: A confined area with buried pesticides but not direct contact with population is a potential source of risk. However, no evidence of exposure to pesticides was found in this area. Increased reports of respiratory symptoms could be explained by increased risk perception or other environmental exposures in the area.
References:

Rull RP Ritz B. Historical Pesticide Exposure in California Using Pesticide Use Reports and Land-Use Surveys: An Assessment of Misclassification Error and Bias. Environmental Health Perspectivas.2003; 111(13):1582-1589

Rull RP, Ritz B, Shaw GM. Neural Tube Defects and Maternal Residential Proximity to Agricultural Pesticida Applications. Am J Epidemiol 2006;163:743–753

Yates SR, Wang D, Papiernik K, Gan J. Predicting pesticide volatilization from soils. Environmetrics. 2002;13: 569–578

Girma M. Review of pesticide use in irrigated crops and its effect on animals human and the environment. International Centre of Insect Physiology and Ecology (ICIPE). Ethiopia. 2005.

Lee S, McLaughlin R, Harnly M, et. al. Community Exposures to Airborne Agricultural Pesticides in California: Ranking of Inhalation Risks. Environ Health Perspect. 2002;110(12):1175–1184

Zartarian VG, Ott WR, Duan N. Basic Concepts and Definitions of Exposure and Dose. Exposure analysis. Ed. Ott WR, Steinemann AC, Wallace LA. Taylor & Francis Group. Boca Raton, FL. 2007