

# REPORTED HUMAN HEALTH EFFECTS FROM GLYPHOSATE

## EXECUTIVE SUMMARY

For more than 30 years, Colombia has been fighting the problem of illicit drug crop cultivation, including coca, opium poppy and marijuana. Pursuant to its international agreements, the government of Colombia (GOC) started the Illicit Crop Eradication Program (PECI) to help control the production and supply of narcotics. The PECI includes several strategies, one of which is the aerial application of a mixture based on the herbicide glyphosate to eradicate coca, in accordance with criteria defined by the Drug Advisory Council (CNE) and the Counter-narcotics Department of the Colombian National Police (DIRAN).

In recent years, there has been a substantial increase in complaints from peasants living in areas where aerial spraying has occurred. Filed with local authorities, these complaints include the possible human health effects from exposure to glyphosate mixtures. Consequently, the GOC and the U.S. government (USG) believe it is critical to determine scientifically if these health effects could result from the aerial eradication program.

The Embassy of the United States of America, through its Narcotics Affairs Section (NAS), commissioned the Uribe Cualla Toxicology Clinic in Bogota to design and conduct a study in the municipalities in Putumayo where controlled spraying was carried out by DIRAN between December 2000 and February 2001. The project also included the presentation of two seminar-workshops on pesticide health and safety to local public authorities, departmental health workers and interested non-governmental organizations.

The study's objectives were to observe and measure, retrospectively, (1) the possible human health effects of glyphosate exposure associated with aerial eradication between December 2000 and February 2001 and (2) the possible effect of exposure to other pesticides used to cultivate coca in Putumayo.

Ideally, one should conduct a prospective epidemiological study to assess exposure to a chemical compound and possible health effects. Because the decision was made to conduct the current study five months after spraying occurred, it was not possible to conduct a prospective study. A retrospective study, the only kind that can be implemented after the fact, however, does not permit the investigator to establish or rule out a correlation between exposure to a given substance and specific health complaints. Furthermore, it does not allow the investigator to formulate a plausible hypothesis to explain morbidity attributable to the effect of low-level exposure to a chemical substance of low potential toxicity such as glyphosate. Despite these limitations, NAS decided to conduct the study in order to obtain objective field data that can help to determine if the alleged relationship between health complaints and the spray program has any validity.

## Findings

Based on the data obtained and analyzed for this study, coupled with local and regional data on morbidity and existing toxicological and scientific information on glyphosate, the investigators could not determine that DIRAN aerial spraying with glyphosate between December 2000 and February 2001 was responsible for the complaints of illness and other health problems reported by inhabitants of Putumayo. In fact, the data show there are many other factors that contribute to health problems in this area.

Among the findings of this study are:

- First, the prevalence of health problems observed in the study population was similar to the prevalence found in epidemiological reports from years prior to the start of the PECl, both in towns targeted by the program (e.g. La Hormiga) and in towns in departments where illicit crops have yet to be sprayed for eradication, such as Puerto Wilches and San Vicente de Chucuri in the Department of Santander (See Table 5.1). The morbidity rates are consistent with poor health conditions, poverty, lack of potable water, inadequate personal hygiene, lack of adequate sewage facilities and solid waste disposal, and inadequate food handling in Putumayo. The rate of unsatisfied basic needs (UBN) was 78.7% in 2001. The poverty rate in the department was <sup>1</sup> 68.9% in 1998.
- Secondly, the diseases the study population attributed most often to glyphosate spraying - gastrointestinal symptoms (diarrhea, vomiting and nausea), skin problems (pruritus or itching, erythema or reddening, vesicles or blisters, burning sensation and pustules), eye problems (burning, reddening or conjunctival injection, pain and pruritus), respiratory symptoms (dyspnea or tiredness, coughing and a cold or rhinorrhea), cephalgia and fever - can have a variety of causes. These include infection and allergies in addition to chemical exposure.
- Third, the health complaints are not related to the subjects' location at the time of spraying. According to the collected data, an important percentage of those who filed complaints were situated more than two kilometers from the field at the time of spraying (46 subjects, 11.4%). At this distance, it is virtually impossible to receive a sufficient dose of glyphosate to cause a clinically appreciable effect. The measured maximum drift of PECl aerial spraying is 5 to 10 meters. In contrast, the study found that most of the subjects who said they had not been ill were either in the field at the time of spraying or at a distance of less than one kilometer (75 subjects, 88.2%). If there were a

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<sup>1</sup> National Department of Planning. [www.dpn.gov.co](http://www.dpn.gov.co)

relation between spraying and illness, we would expect the percentage of those unaffected to increase with distance, not decrease.

- The symptoms manifest by the population can be caused by chronic exposure to the wide variety of agricultural chemicals used to cultivate coca in Putumayo. For example, 382 (78.3%) of the 488 people studied claim to handle some type of agricultural chemical. Ten of the 26 pesticides used by the study population in the last six months belong to toxicity category I: “extremely toxic,” with Gramoxone (paraquat) being the pesticide used by the highest percentage of individuals in the study population (20.9%). These substances are far more toxic than glyphosate and are known to cause the symptoms reported by inhabitants of the region. Moreover, the study found that 91.1% of the subjects who reported using pesticides (348 individuals) employ no means of personal protection. Pesticides are usually applied with a back pump or *cacorro*. Coca farmers also use inappropriate means such as static irrigation. The data shows that exposure to these chemicals can affect the entire family, because women and children (67.0% of the study population) help to mix and apply pesticides. These products are used frequently (weekly in some cases) and are commonly stored in the home, under beds and near food. Handling and storage of these products in such a manner significantly increases the likelihood of exposure.

## Methodology

The field team collected complaints filed with municipal authorities to determine the number of people who complained, the principal symptoms reported and their frequency, and the number of people affected in each village. The team then designed a clinical research instrument (CRI) to obtain data from the study population. Questions addressed spraying dates, symptoms, their duration and evolution, the demand for and use of health care services, non-health-related problems attributed to spraying, exposure to other agricultural chemicals, the use of occupational protective measures, methods used to store, prepare and apply agricultural chemicals, and the handling of pesticide packages and containers. The clinical evaluation featured relevant questions on current illness and personal and family background, basic demographic data (identification, sex, schooling, etc.), a physical exam, a diagnosis and collection of blood and urine samples.

The field work for the study was conducted as part of a health brigade that offered free medical care, including general check-ups and distribution of medicines. The brigade operated for 10 days, from June 10 to June 20, 2001. During that time, it visited nine of the 12 scheduled villages located in the municipal districts of San Miguel, Orito and Valle del Guamuez. The brigade served 1,244 outpatients and administered the CRI to 500 individuals.

The investigators included subjects in the study based on two criteria:

1. Subjects who claimed to have experienced health problems or illness during the four weeks subsequent to the last spraying (designated as *case*); and .
2. Subjects who claimed to have experienced no health problems or illness during the four weeks subsequent to the last spraying, in spite of living in the same village and being of the same sex and approximately the same age as the previous cases (designated as *control*).

The investigators also collected blood samples from 266 of the 500 subjects to determine cholinesterase activity and urine samples from 489 to determine levels of paraquat and glyphosate. The investigators invalidated 12 subjects because the CRI contained incomplete information, leaving 488 subjects in the study.