

Retrospective Study on Reported Human Health Effects from Glyphosate Exposure
Uribe Cualla Toxicology Clinic

EMBASSY OF THE UNITED STATES OF AMERICA

URIBE CUALLA TOXICOLOGY CLINIC

**RETROSPECTIVE STUDY ON REPORTED HUMAN HEALTH
EFFECTS FROM GLYPHOSATE EXPOSURE**

APPENDIX 1

SAMPLE RISK CALCULATIONS

Department of Putumayo

**Bogota, D.C., Colombia
December, 2001**

RISK FROM EXPOSURE TO THE COMERCIAL GLYPHOSATE MIXTURE USED BY THE ILLICT CROP ERADICATION PROGRAM

TABLE No. 1
CALCULATION OF CUTANEOUS EXPOSURE TO GLYPHOSATE
(ACID EQUIVALENT - ae)

STEP	DESCRIPTION - PROCEDURE
1. Define the dose per surface	Application: 6.25 gl /ha of the mixture or $6.25 \text{ gl/ha} * 3.785 \text{ l/g} = 23.656 \text{ l/ha}$ of the mixture (which contains 10.4 l of Roundup ¹).
2. Quantify the active ingredient (ai) per surface unit	Glyphosate content $ae^2 = 360 \text{ g/l}$, therefore: $360 \text{ g/l} * 10.4 \text{ l/ha} = 3,744 \text{ g/ha}$ or 374 mg/m^2
3. Calculate the dose received by a 70 kg human being, if totally impregnated with the sprayed mixture.	<ul style="list-style-type: none"> • Corporal surface³ = 1.73 m^2 • Dose received: $374 \text{ mg/m}^2 * 1.73 \text{ m}^2 = 647.02 \text{ mg}$ Equivalent to the following for 70 kg: $647.02 \text{ mg}/70 \text{ kg} = 9.24 \text{ mg/kg}$ of live weight
4. Compare with data from experimentation or observation.	<ul style="list-style-type: none"> • The LD₅₀ for rats by the cutaneous pathway is $> 5,000 \text{ mg/kg}$ (figure for comparison), Accordingly, for 70 kg: $5,000 \text{ mg/kg} \div 9.24 \text{ mg/kg} = 541$ times less than the LD₅₀

¹ Mixture applied by PECl contains: 10.4 liters of Roundup Ultra; 0.24 liiters of Cosmoflux 411F and 13.02 liters of water

² Glyphosate content as equivaent acid in Roundup Ultra or Fuede®

³ Harrison's Principles of Internal Medicine, 13 th. Ed. 1991.

RISK FROM EXPOSURE TO THE COMERCIAL GLYPHOSATE MIXTURE USED BY THE ILLICT CROP ERADICATION PROGRAM

TABLE No. 2

CALCULATION OF ORAL EXPOSURE FROM INGESTION OF WATER SPRAYED WITH THE PEGI GLYPHOSATE MIXTURE

STEP	DESCRIPTION-PROCEDURE
1. Calculate the concentration in sprayed water.	Dose per m ² = 374 mg/m ² of glyphosate as ae Therefore, if a 1m ² sheet of sprayed water 10 cm deep is equivalent to 100 l of water: $374 \text{ mg/m}^2 \div 100 \text{ l/m}^2 \text{ of water} = 3.74 \text{ mg/l of glyphosate as ae.}$
2.. Calculate the dose received by a 70 kg human being with ingestion of 1 liter of sprayed water.	<ul style="list-style-type: none"> • Dose received by ingesting 1 liter of sprayed water: $3.74 \text{ mg} / 70 \text{ kg} = 0.05 \text{ mg} / \text{kg of live weight}$
3. Compare with data obtained through experimentation or observation.	<ul style="list-style-type: none"> • The LD₅₀ for rats by the \oral pathway is 5,000 mg/kg (figure for comparison), Accordingly: for 70 kg: $5,000 \text{ mg/kg} \div 0.05 \text{ mg/kg} = 100,000 \text{ times less than the LD}_{50}$

NOTE: These calculations are based on the assumption that the water is not moving (cisterns, tanks, lakes, etc.)

RISK FROM EXPOSURE TO THE COMERCIAL GLYPHOSATE MIXTURE USED BY THE ILLICT CROP ERADICATION PROGRAM

**TABLE No. 3
 CALCULATION OF CUTANEOUS EXPOSURE TO POEA**

STEP	DESCRIPTION - PROCEDURE
1. Define the dose.	One liter of Roundup (a commercial product) contains no more than 180 g of POEA ⁴ /l. The dose applied per ha: (180 g/l * 10.4 l/ha) = 1,872 g/ha or 187 mg/m ²
2. Calculate the dose received by a 70 kg human being if sprayed completely.	Corporal surface: 1.73 m ² Dose received: 187 mg/m ² * 1.73 m ² = 323.5 mg of POEA Equivalent for a typical weight of 70 kg: 323.5 mg/70 kg = 4.62 mg/kg of live weight
3. Compare with data obtained through experimentation or observation.	<ul style="list-style-type: none"> The LD₅₀ for rabbits by the cutaneous pathway⁵ > 1,260. Accordingly, absorption of the dose received for 70 kg: 1,260 mg/kg ÷ 4.62 mg/kg = 273 times less than the lethal dose (LD ₅₀)

⁴ Maximum quantity of POEA in the glyphosate product.

⁵ Birch, 1977, in Williams, Kros and Munro. December 1999.

RISK FROM EXPOSURE TO THE COMERCIAL GLYPHOSATE MIXTURE USED BY THE ILLICT CROP ERADICATION PROGRAM

**TABLE No. 4
CALCULTION OF ORAL EXPOSURE TO POEA**

STEP	DESCRIPTION - PROCEDURE
1. Calculate the concentration in sprayed water	The POEA dose applied per hectare is: $(180 \text{ g/l} * 10.4 \text{ l/ha}) = 1,872 \text{ g/ha}$ or $(1,872 \text{ g/ha} * 1,000\text{mg}) \div 10,000 \text{ m}^2 = 187 \text{ mg/m}^2$ A 1m^2 sheet of sprayed water 10 cm deep is equivalent to 100 l of water. Therefore: $187 \text{ mg/m}^2 \div 100 \text{ l/m}^2 = 1.87 \text{ mg/l}$ of POEA.
2.. Calculate the dose received by a 70 kg human being by ingesting one liter of sprayed water.	<ul style="list-style-type: none"> • Dose received by ingesting one liter of sprayed water: $1.87 \text{ mg} / 70 \text{ kg} = 0.03 \text{ mg} / \text{kg}$ of live weight
3. Compare with data obtained through experimentation or observation.	<ul style="list-style-type: none"> • The LD₅₀ for rats by the oral pathway is 1,200 mg/kg (figure for comparison. Accordingly, for 70 kg: $1,200 \text{ mg/kg} \div 0.03 \text{ mg/kg} = 40,000$ times less than the LD₅₀

NOTE: The foregoing calculations are based on the assumption that the entire quantity of applied POEA is absorbed through the oral pathway.

RISK FROM EXPOSURE TO THE COMERCIAL GLYPHOSATE MIXTURE USED BY THE ILLICT CROP ERADICATION PROGRAM

**TABLE No. 5
 CALCULATION OF CUTANEOUS EXPOSURE FOR COSMOFLUX 411F**

STEP	DESCRIPTION - PROCEDURE
1. Calculate the concentration in sprayed water.	Dose of Cosmoflux per hectare = 0.24 l/ha, which is equivalent to: $0.24 \text{ l/ha} * 0.84 \text{ g/l} = 0.2 \text{ g/ha}$ or 0.02 mg/m^2 , taking into account that Cosmoflux has a specific gravity of 0.84 g/l:
2. Calculate the dose received by a 70 kg human being, if impregnated completely.	<ul style="list-style-type: none"> • Corporal surface = 1.73 m^2 • Dose received: $0.02 \text{ mg/m}^2 * 1.73 \text{ m}^2 = 0.0346 \text{ mg}$ Equivalent to the following for 70 kg: $0.0346 \text{ mg}/70 \text{ kg} = 0.000494 \text{ mg/kg}$ of live weight Assuming the LD ₅₀ for rats by the cutaneous pathway ⁶ is > 2,000 mg/kg, the dose is the following for 70 kg: $: 2,000 \text{ mg/kg} \div 0.000494 \text{ mg/kg} = 4,048,583$ times less than the LD ₅₀ .

RISK FROM EXPOSURE TO THE COMERCIAL GLYPHOSATE MIXTURE USED BY THE ILLICT CROP ERADICATION PROGRAM

**TABLE No. 6
 CALCULATION OF ORAL EXPOSURE TO COSMOFLUX 411F**

STEP	DESCRIPTION - PROCEDURE
1. Calculate the concentration in sprayed water	Dose of Cosmoflux applied per m ² = 0.02 mg/m ² A 1m ² sheet of water 10 cm deep contains 100 liters of water. Accordingly: $0.02 \text{ mg/m}^2 \div 100 \text{ l/m}^2 = 0.0002 \text{ mg/l}$ of Cosmoflux
2.. Calculate the dose received by a 70 kg human being by ingesting one liter of sprayed water.	<ul style="list-style-type: none"> Dose received by ingesting one liter of sprayed water: $0.0002 \text{ mg} / 70 \text{ kg} = 0.0000028 = 2.8 \text{ E-6 mg / kg}$ of live weight
3. Compare with data obtained through experimentation or observation.	The LD ₅₀ for rats by the oral pathway is 2,000 mg/kg (figure for comparison), Accordingly, for 70 kg: $2,000 \text{ mg/kg} \div 2.8 \text{ E-6 mg/kg} = 714,285,714$ times less than the LD ₅₀

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REPORTED HUMAN HEALTH EFFECTS FROM GLYPHOSATE

APPENDIX 2

PREOPERATIVE PHASE

Department of Putumayo

**Bogota, D.C., Colombia
December, 2001**

PREOPERATIVE PHASE

The study was designed to be conducted in the Department of Putumayo, pursuant to the contract between the United States Embassy (NAS) and the Uribe Cualla Toxicology Clinic. The Putumayo Department of Health (DASALUD) was contacted and its director, Dr. Angela Reina, appointed Diva Revelo, Head of Epidemiology, to send the Uribe Cualla Clinic reports of complaints filed with local authorities.

In May, Dr. Camilo Uribe, Scientific Director of the Uribe Cualla Toxicology Clinic, and Dr. Olga Lucia Melo, Toxicology Resident of the Rosario University School of Medicine - Uribe Cualla Clinic Program, held an initial meeting with Diva Revelo, who gave her professional opinion of the complaints filed with local authorities. As evidence of the cases handled by the Putumayo Department of Health, Nurse Revelo agreed to send a list of complaints, per municipality or village. This information was to be used to determine the study zones and to coordinate the field work with local health officials and other public authorities. The list was to be sent as soon as possible.

However, given the delay in receiving the information on complaints and patients attended by DASALUD - Putumayo, the project director and the US Embassy decided to send a medical professional and the logistics manager to Mocoa and Puerto Asís to obtain the necessary information and to make arrangements for the field work and the seminars. The embassy appointed Hilda Sarmiento to accompany the mission and to arrange lodging, transportation and food for the seminar group in Puerto Asís. As agreed in advance, the cost of these items was to be covered by the embassy.

During the mission, Dr. Alejandra Salcedo, Resident Clinical Toxicologist at the Rosario University Toxicology Clinic, met with Diva Revelo in Puerto Asís and obtained all the information on complaints filed with authorities. She also coordinated the field work, which was to be carried out through a health brigade, with assistance from the public hospitals in Orito and La Hormiga. Arrangements were made for the research team to be accompanied by the health worker from each village.

At the same time, Mr. Yesid Gastelbondo made arrangements with authorities for appropriate vehicles and drivers to guarantee the safety of the field team. This was difficult, since FARC guerrillas and AUC paramilitaries are struggling for territorial control in Putumayo. Only one vehicle and one driver were found. According to the authorities and the driver, travel in areas of conflict increases travel time and security risks, since it is impossible to go directly from a guerrilla zone to one controlled by paramilitary forces.

The topics of the two seminars to be presented in Puerto Asís were defined pursuant to the object of the contract. One seminar was scheduled for

departmental authorities and interested NGOs (June 21); the other was for personnel from the Putumayo Health Department (June 22). After an analysis of suggestions from DASALUD, a decision on the topics of both seminars was reached during a meeting with Suzanne Sheldon and Luis Eduardo Parra at the US Embassy. The invitation list, the text of the invitation and the program were defined on that occasion (Attachment 3: Invitation, Attachment 4: Invitation List, and Attachment 5: Program).

As agreed with DASALUD, Suzanne Sheldon and Luis Eduardo Parra (representatives of the US Embassy), the field work was scheduled for June 11-20, 2001.

An analysis of the complaints showed the following:

San Miguel

- Six hundred forty-three complaints filed with the San Miguel municipal representative were reviewed.
- The symptoms mentioned most often were cephalgia, fever, acute respiratory infection referred to as a cold, diarrhea and unspecified cutaneous eruptions. It was not possible to determine the number of people who supposedly were affected, since most of the complaints were filed by the head of the household and the subjects were family members. Consequently, the total number of complaints does not reflect individual reports of symptoms.

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**TABLE 1. DISTRIBUTION OF HEALTH COMPLAINTS BY VLLAGE
MUNICIPALITY OF SAN MIGUEL – January-February 2001**

VILLAGE	No OF COMPLAINTS	%
Agua Blanca	56	8.7
San Juan	44	6.8
Bajo Amaron	40	6.2
La Floresta	40	6.2
San Marcelino	40	6.2
San Fernando	38	5.9
Guisita	35	5.4
Limonal	34	5.3
El Chiguaco	33	5.1
Risaralda	32	5.0
El Espinal	29	4.5
El Aguila	27	4.2
Yarinal	23	3.6
San Vicente	18	2.8
Nueva Esperanza	18	2.8
Nueva Cristalina	18	2.8
Agua Clara	14	2.2
Dios Peña	11	1.7
La Cruz	10	1.6
La Danta	10	1.6
San Carlos	9	1.4
Alta Floresta	8	1.2
Nueva Risaralda	7	1.1
Jordán Ortiz	7	1.1
Nuevo Vergel	6	0.9
El Vergel	5	0.8
El Maizal	4	0.6
La Cristalina	3	0.5
Santa Marta	3	0.5
El Porvenir	3	0.5
La Dorada	3	0.5
La Borada	3	0.5
Baja Floresta	2	0.3
La Cristalina Ii	2	0.3
Puerto El Sol	2	0.3
Canadá	2	0.3
Vieja Risaralda	1	0.2
Barrio Amistad	1	0.2
La Montañita	1	0.2
Sin Dato	1	0.2
TOTAL	643	100.0

Valle del Guamuez

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The report from the DASALUD Epidemiology Section contains the following figures on health complaints filed at villages in the municipality of Valle del Guamuez.

The municipal representative of La Hormiga, which is located in the municipality of Valle del Guamuez, received 800 complaints from local inhabitants; 584 referred to health problems (73 percent). The form used to file these complaints makes it possible to establish the distribution of supposedly affected individuals.

**TABLE 2. DISTRIBUTION OF PEOPLE WHO REPORTED SYMPTOMS
MUNICIPALITY OF VALLE DEL GUAMUEZ
JANUARY – FEBRUARY 2001**

VILLAGES	No. OF SUPPOSEDLY AFFECTED SUBJECTS	%
La Esmeralda	194	8.50
Los Angeles	157	6.88
San Isidro	121	5.30
El Placer	114	4.99
Las Vegas	101	4.42
Alto Palmira	89	3.90
Costa Rica	88	3.85
La Pradera	73	3.20
Brisas Del Palmar	72	3.15
Miravalle	69	3.02
Santa Rosa Del Guamuez	67	2.93
La Florida	65	2.85
Jardín	65	2.85
La Betania	59	2.58
Santa Teresa	59	2.58
Laureles	57	2.50
La Concordia	52	2.28
Guadales	51	2.23
Varadero	50	2.19
Oasis	46	2.01
El Rosal	44	1.93
Recreo	38	1.66
San Andres	38	1.66
Zarzal	38	1.66
La Palestina	34	1.49
Alto Huisia	34	1.49
Nueva Isla	31	1.36
Loro 8	31	1.36
Sultana	29	1.27
Loro 1	27	1.18
Villa Duarte	27	1.18
Venado	19	0.83
Alto Rosal	18	0.79
Delicias	16	0.70

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Llano Verde	16	0.70
Caribe	15	0.66
La Raya	15	0.66
Mundo Nuevo	15	0.66
El Tigre	13	0.57
Providencia	12	0.53
Campo Hermoso	11	0.48
La Primavera	10	0.44
Las Brisas	10	0.44
Agua Blanca	9	0.39
El Retiro	7	0.31
Diamante	7	0.31
San Marcos	6	0.26
Montebello	6	0.26
El Arauca	6	0.26
Los Llanos	5	0.22
Afilador	5	0.22
Los Pomos	5	0.22
El Cairo	4	0.18
Alto Temblón	4	0.18
La Campiña	4	0.18
El Edén	4	0.18
Convoy	3	0.13
Los Olivos	3	0.13
La Isla	3	0.13
San Antonio	2	0.09
Loro 2	2	0.09
Puerto Amor	2	0.09
Jordán Huisia	2	0.09
Nuevo Horizonte	2	0.09
La Pedregosa	2	0.09
	2283	100.00

Source: La Hormiga Municipal Representative, Valle del Guamuez

The symptoms reported most often were fever (250 reports), skin rash or “allergy” and colds (a term people use for what is clinically described as acute respiratory infection-ARI).

Orito

The report from the DASALUD Epidemiology Section contains the following figures on health complaints filed at villages in the municipality of Orito.

**TABLE 3. DISTRIBUTION OF SUPPOSEDLY AFFECTED SUBJECTS BY VILLAGE
AND DISTRICT
MUNICIPALITY OF ORITO - 2001**

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VILLAGE	No. SUPPOSEDLY AFFECTED SUBJECTS	%
Siberia	116	14.0
Primavera Del Guamuez	90	10.9
Cabañas Del Guamuez	88	10.7
Batería Churuyaco 1	86	10.4
Alto Guisia	84	10.2
Brisas Del Guamuez	65	7.9
La Ruidosa	62	7.5
Bonaire	58	7.0
Remolino	55	6.7
Bajo Primavera	47	5.7
El Azul	37	4.5
Pedregosa	30	3.6
San José Del Guamuez	8	1.0
Nogales	33	27.7
La Playa	28	23.5
Flor Del Campo	25	21.0
Cartagena	13	10.9
Santa Teresa	13	10.9
Lusitania Churuyaco	7	5.9
Santa Lucia	89	27.9
Argentina	89	27.9
El Empalme	63	19.7
Jardines De Sucumbios	44	13.8
La Libertad	34	10.7
Total	1264	100.0

The villages with the highest number of supposedly affected individuals were selected for the field work. This initial selection is shown below.

TABLE 4. VILLAGES SELECTED INITIALLY

VALLE DEL GUAMUEZ

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 Uribe Cualla Toxicology Clinic

SAN MIGUEL

VILLAGE	NO. OF COMPLAINTS
Agua Blanca	56
San Juan	44
Bajo Amarón	40
San Marcelino	40
San Fernando	38
La Guisita	35
Limonal	34
Chiguaco	33
Risaralda	32
El Aguila	27
Yarinal	23
La Danta	10
La Cruz	10

VILLAGE	SUPPOSEDLY AFFECTED INDIVIDUALS
Esmeralda	194
Los Angeles	157
San Isidro	121
El placer	114
Las vegas	101
Alto Palmira	89
Costa rica	88
La pradera	73
Brisas del palmar	72

ORITO

VILLAGE	SUPPOSEDLY AFFECTED INDIVIDUALS
Siberia	116
Primavera del Guamuez	90
Cabañas del Guamuez	88
Batería Churuyaco 1	86
Alto Guisia	84
Santa Lucia	89
Argentina	89
El Empalme	63

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Later, the feasibility of travel by land and the time this would require were considered in order to arrive at a final selection. These variables are shown in the following chart.

TABLE 5. ACCESS BY LAND OR RIVER

FROM	TO	ROAD	PATH	RIVER	TIME (minutes)
HORMIGA	Alto Palmira	YES			40
	Miravalle	YES			30
	La Esmeralda	YES			90
	Las Vegas	YES			30
	El Placer	YES			40
	Costa Rica	YES			120
	San Isidro	YES			90
	Pradera	YES			20
	Loro Ocho	YES			30
	La Cruz	YES			15
	San Fernando	YES			60
LA DORADA	Nueva Risaralda	YES			15
	Nuevo Vergel	YES			30
	Chiguaco	YES			40
	Bajo Amaron	YES			30
	San Carlos	YES			60
	Las Palmas	X	YES		120
	El Aguila	YES			90
	San Miguel	YES			30
	Yarinal	YES	YES	YES	180
	San Marcelino	YES			90
	Risaralda	YES			15
	Alta Floresta	YES			30
	Floresta	YES			30
	San Juan	YES			10
	Agua Blanca	YES			30
La Guisita	YES			120	

The final selection included the villages of El Empalme, Jardín de Sucumbios and Siberia in the municipality of Orito; La Esmeralda, Los Angeles, El Placer and Las

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Vegas in Valle del Guamuez; and San Marcelino, Chiguaco, Bajo Amarón and Yarinal in San Miguel.

The number of CRIs administered in each village was determined by its percentage of complaints with respect to the total.

TABLE 6. NO. OF AFFECTED INDIVIDUALS PER MUNICIPALITY

DATE	MUNICIPALITY	VILLAGES	SUPPOSEDLY AFFECTED INDIVIDUALS OR NO. OF COMPLAINTS	NUMBER OF CRIs TO BE ADMINISTERED
11 June	Orito	El Empalme	63 affected	57
12 June		Jardín de Sucumbios	44 affected	57
13 June		Siberia	116 affected	57
14 June	San Miguel	San Marcelino	40 complaints	32
15 June		Chiguaco Yarinal	33 complaints 23 complaints	32
16 June		Bajo Amarón El Aguila	40 complaints 27 complaints	32
17 June	La Hormiga	La Esmeralda	194 affected	77
18 June		Los Angeles	157 affected	77
19 June		El Placer - Las Vegas	114 affected	77
20 June		TOTAL		

Once the villages were selected, the field work schedule was defined (Attachment 6: Chronology of Field Work). An invitation publicizing the Health Brigade was prepared for broadcast by the principal radio stations in Putumayo (Attachment 2: Radio Invitation). To help promote the brigade, local health and community workers were informed as well.

The research group decided to hire Dr. Juan Eduardo Céspedes, an epidemiologist with experience in field work, to evaluate the CRI and to be part of the research group during the seminar-workshops, analysis of the information and preparation of the final report. In conjunction with Dr. Céspedes, the group agreed its investigation would be an analytical retrospective study of cases and controls. The CRI was modified as a result.

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APPENDIX 3

OPERATIVE PHASE

Department of Putumayo

**Bogota, D.C., Colombia
December, 2001**

Contents:

- A detailed chronological description of the field work
- Samples: collection procedures, packing and shipment, according to the refrigeration protocol, the chain of custody and laboratory analysis for toxicity
- Data processing and analysis

CHRONOLOGICAL DESCRIPTION

The following is a detailed chronological description of the field work. It notes the difficulties, the number of outpatients served, the number of CRIs administered, and the samples collected in each district.

June 9

Mr. Yesid Gastelbondo flew to Puerto Asís on a Narcotics Police flight, taking with him the materials and equipment for the field work. He was responsible for making the necessary arrangements and coordinating transportation for the research team. The materials and equipment were transferred to police headquarters in Puerto Asís, with the help of the local commander, Captain Alejandro Muriel.

June 10

The members of the field team (Dr. Camilo Uribe, Dr. Olga Lucía Melo, Dr. Alejandra Salcedo and Dr. Tania Santodomingo) traveled to Puerto Asís on a commercial flight (AIRES). Upon arriving at 12:00 hours, they were met by an administrative employee of the Uribe Cualla Clinic and Captain Alejandro Muriel, the police commander in Puerto Asís. The team went to police headquarters, checked to make sure the materials for the field work were available, and held a meeting with Captain Muriel to analyze the travel plans as of this date and security in the region. The materials not required for field work were left in police custody, along with certain identification papers.

A meeting was held with Mr. Luis Antonio Yela, the driver hired for the field team. He was advised of the trip's objectives and a route was laid out according to his knowledge of the region. The itinerary also took into account information concerning the whereabouts of guerrilla and paramilitary groups (AUC)

There was also a meeting with Diva Revelo (R.N), a who had come from Mocoa. The work schedule was organized and the team left for Orito at 14:00 hours. Upon arrival in Orito at 17:00 hours, telephone contact was established with Dr. Glinis Díaz, manager of the Orito Hospital, which is a second-tier institution operated by the state. She appointed Eliana Rivadeneiro, a nurse, to help set up the refrigeration protocol for the blood and urine samples. Another nurse, Dora Cerón, was designated to join the team and to help collect the samples.

Eliana Rivadeneiro contacted the local health workers in El Empalme, Jardín de Sucumbios and Siberia (Leticia Villota and Olga García) to let them know the health brigade would proceed according to schedule.

June 11

Travel by land from Orito to El Empalme. The team reached El Empalme at about 09:00 hours and was met by the President of the Community Action Council, in addition to several members of the Council Board and the local health worker (Leticia Villota). Two offices for outpatient consulting were set up in the community hall, which is under construction. A reception area and a space for administering the CRI were arranged in the same facility, along with a pharmacy and an area for collecting samples. The team worked until 19:30 hours, saw 148 patients, prescribed medicine to 90, administered the CRI to 48 subjects and collected 30 blood and 48 urine samples, pursuant to the established protocol for the chain of custody.

At 20:00 hours, Dr. Camilo Uribe and Dr. Olga Melo left the community hall to check on a woman who was about to give birth. Her labor was normal and there were no signs of fetal distress.

On several occasions during the course of the brigade's activities at El Empalme, intelligence personnel from the FARC surveyed the work but did not interfere. According to the President of the Community Action Council, the area has not been sprayed to eradicate coca. He believes exposure was due to drift.

For security reasons, Leticia Villota suggested the team continue on to Jardín de Sucumbios, as opposed to spending the night in El Emplame. Luis Antonio Yela made the necessary contacts for travel at night and the team arrived in Jardín de Sucumbios at approximately 21:00 hours. The trip was uneventful. Leticia Villota provided accommodations for the team in her home.

June 12

Two offices for outpatient consulting were set up at the local health post, along with an area for administering the CRI, another for collecting samples, a medicine distribution point and a reception area. The team worked until 18:00 hours, saw 135 patients and administered the CRI to 66 subjects. Thirty-three blood and 66 urine samples were collected, pursuant to the established protocol for the chain of custody.

At 16:00 hours, nine members of the FARC and their commander, alias "Manuel," held a meeting with Dr. Uribe. He indicated the health brigade was subject to international humanitarian law and noted that one of its activities was to assess possible human health effects from glyphosate spraying and exposure to other agricultural chemicals used in the region. The guerrillas indicated they did not object to brigade continuing its work. The team left for Siberia at 19:00 hours, as

arranged by the driver, and arrived at 20:30 hours. The team made contact with Olga García, the local health worker, who had arranged accommodations at the school, which is one kilometer from the village and has no type of security. Six hammocks were hung in order to pass the night without problems.

June 13

The team went to the health post, where two offices for outpatient consulting had been set up, along with two for administering the CRI and collecting samples. There was also an area for distributing medicines and a reception point. The team worked until 18:00 hours, saw 183 patients, prescribed medication to 118, administered the CRI to 63 and collected 31 blood and 60 of urine. Departure for Orito was at 18:30 hours, as arranged by the driver to obtain the required authorization.

Upon arriving in Orito at 20:00 hours, the team contacted Eliana Rivadeneiro, head nurse at the local hospital, to refrigerate the samples at the facilities of the vaccination program. This was done according to the protocol for the chain of custody and recommendations on cooling.

June 14

By this time, the medicine donated by two pharmaceutical companies (California and Memphis) had run out and the work schedule was suspended until the Uribe Cualla Clinic in Bogota could send new supplies. Another donation could not be arranged, so Dr. Uribe authorized the purchase of \$8,000,000 pesos in medicines and made arrangements with the Counter-Narcotics Police to have them set to the Ecopetrol Airport in Orito. However, the airport could not be used, since Ecopetrol employees were on strike. The medicines were sent to Puerto Asís on June 15 by commercial airline (SATENA). On the night of the 15th, the local AUC commander, alias "Wilson," summoned Dr. Uribe for an explanation of the brigade's work and its itinerary. He told Dr. Uribe the team was operating in AUC territory and would have to report its movements at certain checkpoints set up by this illegal armed group.

June 15

Dr. Uribe and the driver went to Puerto Asís to pick up the medicines at the airport. The rest of the team stayed in Orito, organizing supplies and making arrangements to ship the samples on hand to Bogota. This was done according to the chain of custody and under the care of Dr. Glinis Díaz, manager of the Orito Hospital. She volunteered to take them by air from Puerto Asís, since she was scheduled to attend a Ministry of Health meeting in Bogota. Arrangements were also made with the Uribe Cualla Clinic to pick up the samples at El Dorado Airport in Bogota on June 16.

The medicines were picked up at the airport in Puerto Asís at 11:00 hours, with the help of Captain Alejandro Muriel, and taken to Orito. They arrived at 15:00 hours and were placed under refrigeration at the Orito Hospital. At 16:00 hours, the team left for La Hormiga. Upon arrival at 18:00 hours, the team contacted the manager of the hospital in La Hormiga, Dr. Victor Pérez, who asked the Head of the Nursing Department to put the brigade in touch with the health worker in La Dorada, Cristina García. She also serves the villages of Chiguaco, San Marcelino and Yarinal. La Dorada is 20 minutes from La Hormiga.

Upon reaching La Dorado, the team was detained by two AUC members who behaved aggressively and demanded information. Before authorizing the team to move on, they warned that travel by land after 18:00 hours is prohibited. Arrangements were made with Cristina García for the trip to the Yarinal Indian Reservation the next day. The team left La Dorada for La Hormiga, after requesting authorization to do so at the AUC checkpoint located on the edge of the village. The team spent the night in La Hormiga.

June 16

The team picked up Cristina García in La Dorada, before going on to San Marcelino to catch a boat to the Yarinal Reservation. However, a few kilometers outside La Dorado, they were stopped at the AUC checkpoint. Before being authorized to move on, the team was warned that it was headed for guerrilla territory. About 50 meters from the cut off to San Marcelino, unidentified personnel in uniform detained the team, searched the supplies and stole \$3,000,000 pesos in cash, before ordering a detour to El Aguila. At the school in El Aguila, there was a poster announcing the health brigade, but with the wrong dates. Accordingly, the activities in San Marcelino and Chiguaco were rescheduled for the morning of June 20. The President of Community Action Council and the teacher in Chiguaco agreed to coordinate the necessary arrangements.

At San Marcelino, a port on the La Hormiga River, no one was willing to transport the brigade. Based on information from the President of the Community Action Council in that village, the team headed for Chiguaco, where there is a footpath to Yarinal. Arrival in Chiguaco was at 10:30 hours, where a horse was rented to haul the medicines and equipment. The trip by foot was difficult and lasted two and a half hours. The team arrived in Yarinal at 13:00 hours and was met by the health worker assigned to the reservation. He coordinated the work at the health post, where two offices had been set up for outpatient consulting. There was also a place to administer the CRI and collect samples, an area where medicine was distributed and a reception point. The brigade worked until 16:00 hours, saws 96 patients, prescribed medicine to 60 and administered 36 CRIs, in addition to collecting 26 blood and 33 urine samples. The return trip to Chiguaco was by foot. However, one of the villagers provided a horse to carry the supplies. Travel time was reduced by one hour, since the villager was familiar with the area. From Chiguaco, the brigade went to La Dorado to drop off Christina García, then continued on to La Hormiga, after receiving authorization for travel after dark.

Arrival at the hospital in La Hormiga was at 19:00. With the help of the bacteriologist who was on duty, the samples were refrigerated at the institution's clinical laboratory, according to the refrigeration protocol and the chain of custody.

June 17

The coolers were picked up at the hospital and the refrigeration protocol was coordinated. The brigade left for El Placer. However, before entering the village, it was forced to pay the AUC a toll. Tania Guerrero, the health worker at El Placer, accompanied the brigade to La Esmeralda, where the treasurer of the Community Action Council reported that the health worker was on maternity leave and the health post was closed. He was immediately advised of the official nature of the brigade, as an initiative of DASALUD, and ordered to open the post. Areas were set up for outpatient consulting, to administer the CRI, to collect samples and to distribute medicine. There was also a reception area. The brigade worked until 17:00 hours, saw 190 patients, prescribed medicine to 120, administered 90 CRIs, and collected 45 blood and 90 urine samples. The brigade was back in La Hormiga at 18:15 hours, where the samples were turned over to the hospital for storage, according to the refrigeration protocol and the chain of custody.

Later that night, Dr. Uribe was summoned to a meeting with the local AUC commander to explain the brigade's activities. The meeting lasted until 21:30 hours and there were no setbacks.

June 18

The coolers were picked up at the hospital and the refrigeration protocol was coordinated. The brigade then left for El Placer to pick up Tania Guerrero and continue on to Los Angeles, where it was met by the President of the Community Action Council. Preparations had been made at the school, but the teacher was away and had neglected to leave the keys. With authorization from the Community Action Council, the driver entered the schoolhouse by the roof and opened the door. Two areas were available for outpatient consulting, in addition to an area for administering the CRI, another to collect samples, a reception point, and an area for distributing medicine. The brigade worked until 17:30 hours, saw 200 outpatients, prescribed medicine to 60, administered the CRI to 102 subjects, and collected 54 blood and 102 urine samples. The team was back in La Hormiga by 18:30 hours and turned the samples over to the hospital for storage, pursuant to the refrigeration protocol and the chain of custody.

June 19

The coolers were picked up at the hospital and the refrigeration protocol was coordinated. The brigade then left for El Placer, where Tania Guerrero helped to set up two offices at the health post for outpatient consulting, an office to administer the CRI, another to collect samples, a reception area and another for distributing medicines. The members of the brigade worked until 16:30 hours,

saw 189 patients, prescribed medicine to 160, administered the CRI to 73, and collected 38 blood and 73 urine samples. The brigade was back in La Hormiga by 17:30 hours and turned the samples over to the hospital for storage, pursuant to the refrigeration protocol and the chain of custody.

June 20

The coolers were picked up at the hospital and the refrigeration protocol was coordinated. The brigade went to La Dorada to pick up Cristina García before going on to Chiguaco, where Diva Revelo, Cristina García and Camilo Uribe made arrangements with the school teacher to install the brigade at the schoolhouse. A medical office, reception point and an area for CRI administration and dispensing medicine were set up. The brigade worked until 12:30 hours, saw 56 patients, administered the CRI to 11 and supplied medicine to 56. No samples were collected.

The other members of the brigade (Alejandra Salcedo, Olga Melo and Tania Santodomingo) went on to San Marcelino by land. They were met by the Indian governor, who had set up three areas at the health post. These were used simultaneously to conduct medical examinations, administer the CRI and collect samples. This portion of the brigade worked until 12:30 hours, saw 47 patients, administered the CRI to 13 and collected 11 urine and nine blood samples. Medicines were and distributed to 47 patients.

While the brigade was in San Marcelino, the Indian governor asked if one of the doctors could travel 20 minutes by river to examine a young Indian girl who was in serious condition. Dr. Tania Santodomingo was sent to evaluate the patient. She was accompanied by Luis Antonio Yela. The Indian governor arranged their transportation. The patient was approximately 10 years old and appeared to be suffering from severe osteomyelitis. Dr. Santodomingo washed, debrided¹ and immobilized the extremity, applied an analgesic and antibiotic, and made arrangements for the patient's referral to the hospital in La Hormiga for emergency care. Dr. Santodomingo was then asked to evaluate another patient, whom she diagnosed as suffering from a retained abortion. The patient's referral to the hospital in La Hormiga was arranged. The brigade returned to La Hormiga by land, passing through Chiguaco and La Dorada. The refrigeration protocol in La Hormiga was adapted to include all samples stored at the clinical laboratory and those collected at Chiguaco and San Marcelino. This was done in accordance with the protocol for the refrigeration protocol and the chain of custody. At 16:30 hours, the brigade left La Hormiga for the trip by land to Orito and Puerto Asís. Along the way, an army road block at a spot known as El Cruce stopped the team and asked the doctors to examine several soldiers who were suffering from skin lesions. They were treated with antibiotics.

¹ Removal of lacerated, devitalized or contaminated tissue.

The brigade arrived at the hospital in Orito at 17:40 hours to change the batteries required for the refrigeration protocol and to return several that had been provided on loan. Departure for Puerto Asís was at 17:50 hours. The brigade reached the Puerto Asís Battalion at 19:20 hours, only to learn that travel after 18:00 hours was prohibited. Permission to continue on to Puerto Asís was requested and granted by the commanding officer. Arrival in Puerto Asís was at 19:45 hours. Captain Alejandro Muriel was contacted and arrangements were made for the refrigeration protocol at the police station. Logistic arrangements for the seminar were confirmed.

In all, the brigade performed a total of 1,244 medical examinations and administered the CRI to 502 subjects.

June 21

As scheduled, the Seminar-Workshop on Pesticides: Safe Handling and Environmental Impact was held on June 21 at Comfamiliar for personnel from the Putumayo Department of Health. Fifty-four people attended (See Attachment 8). The participants showed interest in the topic and agreed that the region needs a pesticide epidemiological surveillance system, not only because of the eradication program, but because of agricultural chemical abuse for both legal and illicit crops. Suzanne Sheldon from the US Embassy and Luis Eduardo Parra arrived in Puerto Asís sometime after 12:00 hours.

Copies of the seminar report were distributed in print and in CD-ROM. The participants evaluated the event (See Attachment 9).

June 22

The same seminar-workshop was given on June 22, at Comfamiliar, to departmental and municipal authorities and interested NGOs. There were 52 participants (See Attachment 8). Following an important discussion on the eradication program, the conclusions reached the day before were reiterated. Copies of the seminar report in print and CD-ROM were distributed, and the participants evaluated the event (See Attachment 9).

At the request of Dr. Alvaro Gutiérrez, Director of the Puerto Asís Hospital, Dr. Uribe gave a four-hour lecture on Saturday, June 23 to members of the medical staff on general treatment for intoxication. Afterwards, he was asked to evaluate a patient who was in critical condition due to a suicide attempt with Methlyparathion (an organophosphate pesticide) and a precordial wound with a sharp instrument. He evaluated the patient, gave an opinion on how the case could be handled, and took a sample for analysis in Bogota to determine cholinesterase activity.

Arrangements were made to send the rest of the samples with Suzanne Sheldon, pursuant to the parameters of the chain of custody. As planned, they were to be

picked up at the National Police hangar in Bogota by the Uribe Cualla Clinic. This was done without mishap.

The community was extremely cooperative in providing the facilities and elements required for the health brigade to do its job, and generously arranged food and lodging for the research group.

All members of the team suffered gastrointestinal problems while in the field, probable because of the lack of potable water and conditions for adequate hygiene.

THE SAMPLES

Urine Samples

Each subject (individual-sample) was given a plastic container packed in a sealed bag. The container was used to collect 50 cc of urine from a single miction, under the supervision of one of the team members (physician or health worker). The patient returned the container to the supervisor, who labeled the sample with the respective code and attached an adhesive safety strip. The sample was then placed in the appropriate cooler for storage. The date, time, patient code and evaluator 's signature were entered on a form for this purpose.

Blood Samples

Ten cc of venous blood were drawn from the forearm, after cleansing with alcohol. Each sample was collected in a heparinized tube, which was labeled with the respective code, fastened with an adhesive safety strip and packed in the appropriate cooler. The date, time, patient code and evaluator's signature were registered on the form provided for this purpose.

After the samples were collected at each location, the coolers were sealed and a final closure certificate was drawn up for each one, listing the number of samples inside, their codes, and the date and time the cooler was closed. The certificate was signed by the person in charge.

Packing and Shipment

Pursuant to the protocol for the chain of custody, the samples were labeled with pencil or waterproof ink and the stopper was sealed with a paper sticker. Each urine and blood sample was marked with the same number as the CRI administered to the patient. The urine and blood samples were placed on perforated styrofoam racks designed especially to prevent spilling or breakage. The racks were placed inside thick styrofoam coolers chilled with bags of dry ice. Refrigeration was done in accordance with Internationally accepted procedures.

For the first shipment, Dr. Alejandra Salcedo turned the coolers with the samples and the chain of custody form over to the Director of La Hormiga Hospital, who took them to Bogota on a commercial flight. She, in turn, delivered the coolers and the custody form to a staff member from the Uribe Cualla Toxicology Clinic, who verified delivery and receipt of the samples, including the date and time.

For the second shipment, Dr. Salcedo turned the coolers and the custody form over to Mr. Yesid Gastelbondo, who delivered them to a member of the National Police for transport to Bogota, under the responsibility of Ms. Suzanne Sheldon. In Bogota, the same procedure was repeated when the samples were turned over to a staff member from the clinic. He delivered them officially to Dr. Billy Armando Vargas, Head of the Uribe Cualla Toxicology Laboratory.

The coolers were opened in the presence of Dr. Fernando Flores, a delegate of the National Food and Drug Surveillance Institute (INVIMA). He watched Dr. Vargas verify the contents for subsequent analysis.

According to the protocol for the chain of custody, the only person authorized to open and close the coolers at the beginning and end of each session, in order to verify the presence and condition of all the samples listed on the form, was Dr. Uribe or the person he designated for this purpose. The coolers were to be supervised by members of the team throughout sample collection, storage and shipment.

PROCESSING

Analysis of glyphosate in urine

Glyphosate in urine was analyzed according to the analytical protocol standardized by the CTQ, using high-pressure gas liquid chromatography. The minimum detection limit with this method is 0.1 mg/l.⁽¹⁵⁾

Acetyl-cholinesterase levels in blood

The modified Michel potentiometric colorimetric test was used to measure cholinesterase activity. It measures pH change in the sample, expressed as pH delta units/hour.

Because acetyl-cholinesterase enzyme activity is measured by the pH change it produces in the substrate, heparin (neutral sodium salt) was the anticoagulant used. The anticoagulant EDTA was not used, as it would affect the pH in the sample and produce abnormal results.

Analysis of paraquat in urine

A qualitative test was done to detect paraquat in urine by reducing the paraquat cation to a blue ion radical in the presence of an alkaline reactive and sodium dithionite. This procedure is described below.

- Add an alkaline reactive, such as sodium hydroxide, to 10 ml of urine or gastric aspirate until the pH is above 9.0 (half a teaspoon to a teaspoon of sodium bicarbonate can be used instead).
- Add a spatula blade of sodium dithionite to the alkalinized urine or gastric aspirate and shake lightly.
- View the tube against a white background. A blue or green color in the solution indicates the presence of paraquat and confirms the diagnosis. With high concentrations of paraquat in the urine, the mixture can turn black. In this case, the test should be repeated with a diluted mixture.
- These methods are capable of detecting concentrations of up to 2 mg/dl and can be semicummulative, if a range of patterns is prepared in reference urine samples.

DATA PROCESSING AND ANALYSIS

The information and data obtained through the CRI and the laboratory tests described above were processed and analyzed as follows. 1. Once the instruments used to gather data had been filled out, they were reviewed by the field supervisor to make sure the information was complete. 2. An application based on the ACCESS program was then designed to enter the information in a database. 3. The information was entered and the databases established. 4. They were reviewed to eliminate inconsistencies, then exported using the SPSS program. 5. The information was explored. 6. Some of the variables were recoded to facilitate analysis. 7. Frequencies were constructed for each of the study variables and trend measurements (percentages, averages, etc.) were calculated, depending on the type of variable. 8. Contingency tables were constructed to match and evaluate relationships between two categorical variables. 9. Tables and graphs were prepared to present certain selected findings.

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**RETROSPECTIVE STUDY ON REPORTED HUMAN HEALTH
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APPENDIX 4

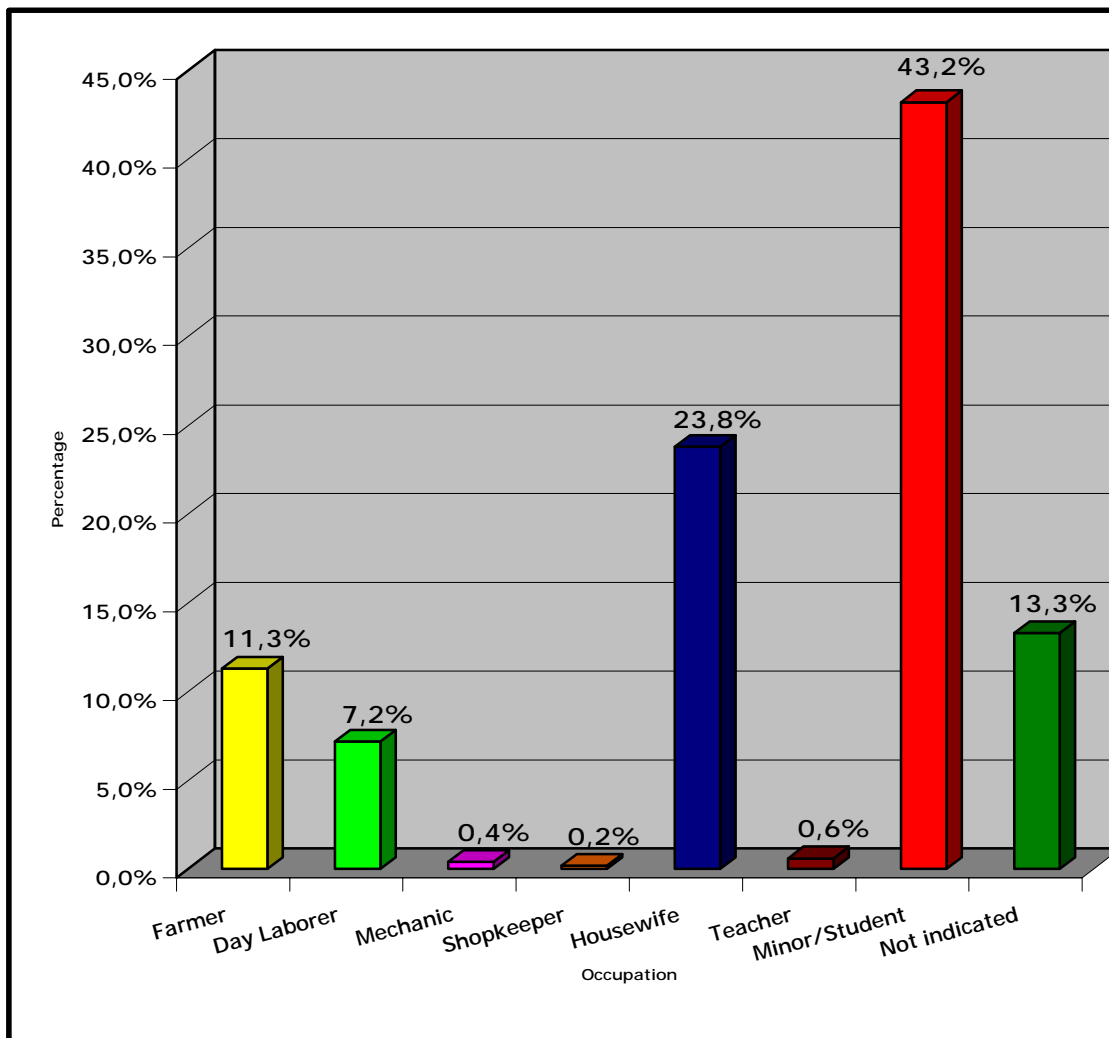
GRAPHS ON DEMOGRAPHIC VARIABLES

Department of Putumayo

**Bogota, D.C., Colombia
December, 2001**

**Reported Human Health Effects from Glyphosate
Uribe Cualla Toxicology Clinic**

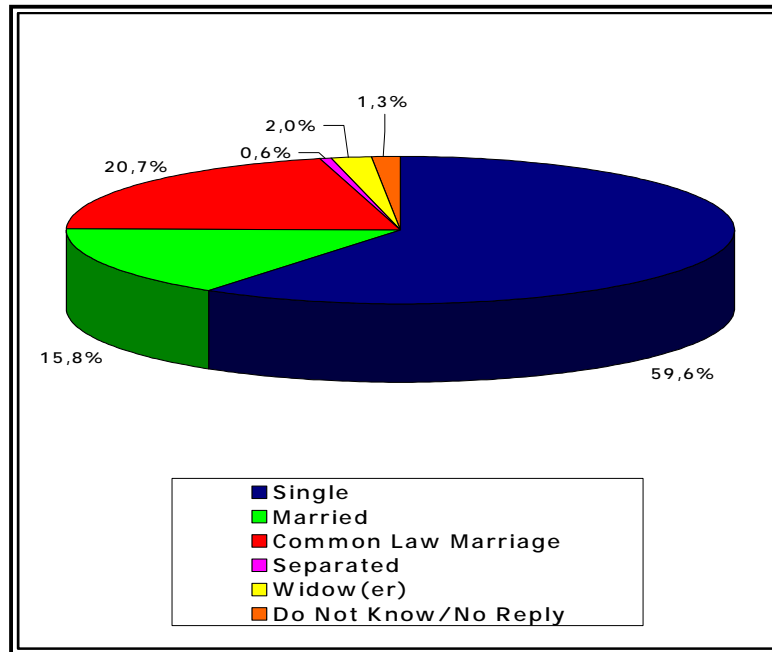
**Graph No. A4- 1
Distribution of the Study Population by Occupation**



Occupation	No. Subjects	%
Farmer	55	11.3
Day laborer	35	7.2
Mechanic	2	0.4
Shopkeeper	1	0.2
Housewife	116	23.8
Teacher	3	0.6
Minor/student	211	43.2
Do Not Know/No Reply	65	13.3
TOTAL	488	100.0

**Reported Human Health Effects from Glyphosate
Uribe Cualla Toxicology Clinic**

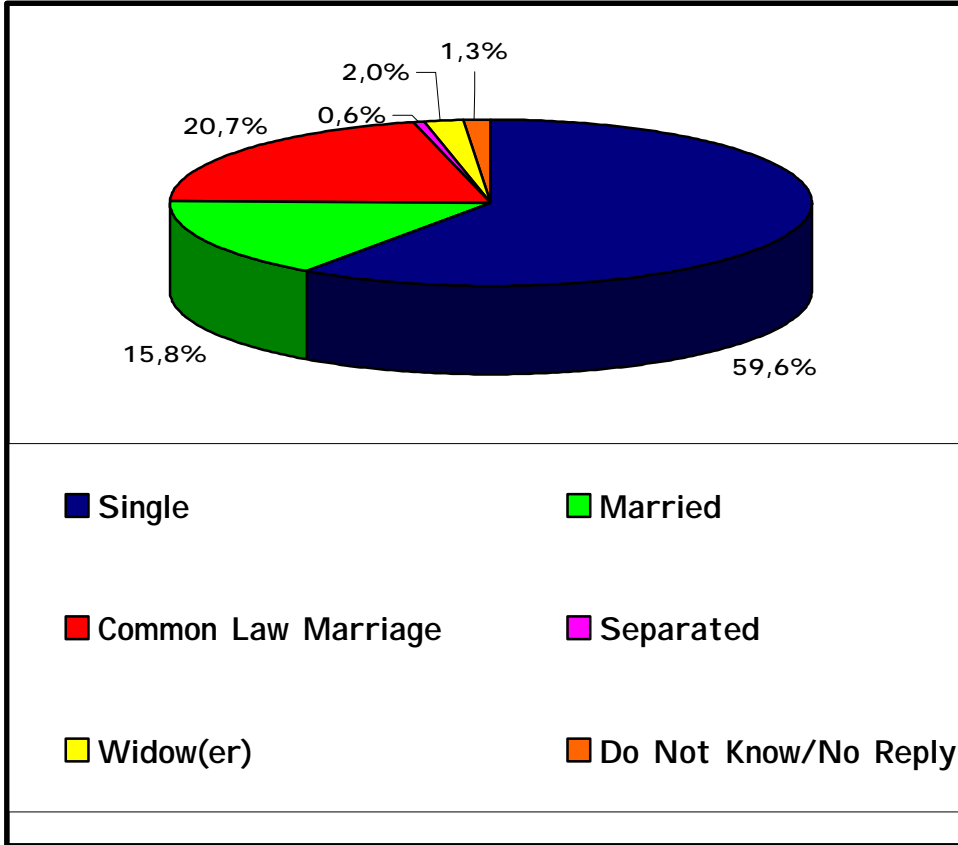
**Graph No. A4- 2
Distribution of the Study Population by Age**



Age	No. Subjects	%
0 -4 years	105	21.5
5-14 years	142	29.1
15- 44 years	215	44.1
45 -59 years	8	1.6
60 years or more	18	3.7
TOTAL	488	100.0

**Reported Human Health Effects from Glyphosate
Uribe Cualla Toxicology Clinic**

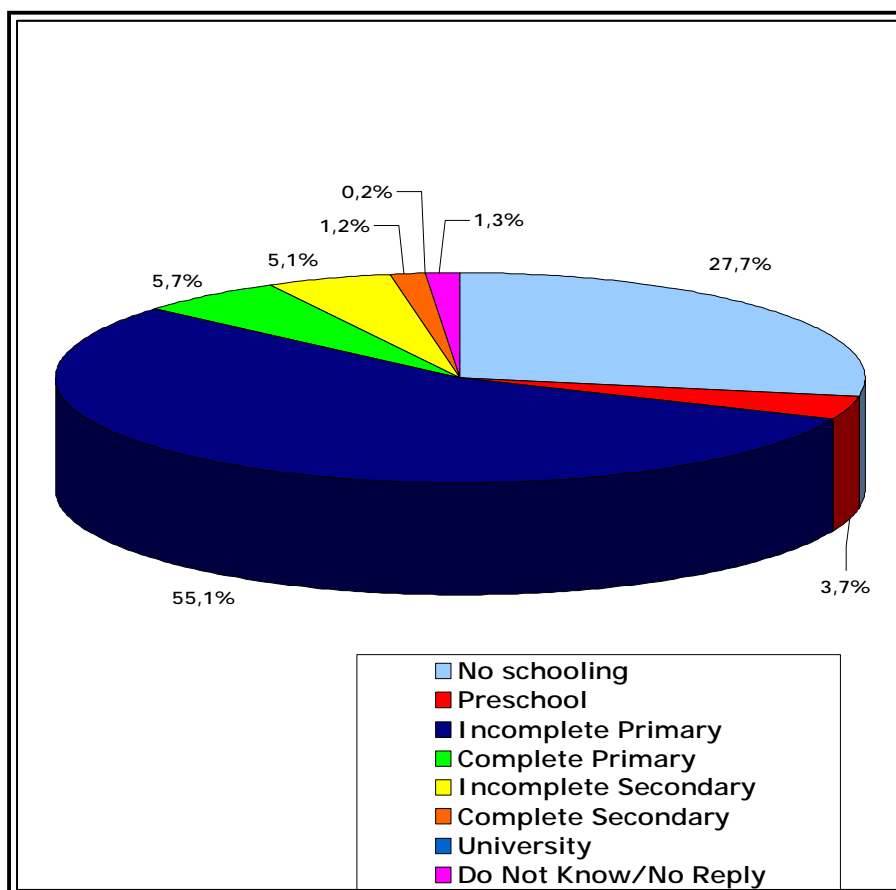
**Graph No. A4- 3
Distribution of the Study Population by Marital Status**



Marital Status	No. Subjects	%
Single	291	59.6
Married	77	15.8
Common Law Marriage	101	20.7
Separated	3	0.6
Widow(er)	10	2.0
Do No Know / No Reply	6	1.3
TOTAL	488	100.0

Reported Human Health Effects from Glyphosate
Uribe Cualla Toxicology Clinic

Graph No. A4- 4
Distribution of the Study Population by Educational Level



Educational Level	No. Subjects	%
No Schooling	135	27.7
Preschool	18	3.7
Incomplete Primary	269	55.1
Complete Primary	28	5.7
Incomplete Secondary	25	5.1
Complete Secondary	6	1.2
University	1	0.2
Do Not Know / No Reply	6	1.3
TOTAL	488	100.0

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URIBE CUALLA TOXICOLOGY CLINIC

**RETROSPECTIVE STUDY ON REPORTED HUMAN HEALTH
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APPENDIX 5

LABORATORY RESULTS

Department of Putumayo

**Bogota, D.C., Colombia
December, 2001**

Retrospective Study on Reported Human Health Effects from Glyphosate Exposure
Uribe Cualla Toxicology Clinic

LABORATORY RESULTS

CODE	0 Name	1 GLYPHOSATE IN URINE	2 PARAQUAT IN URINE	3 CHOLINESTERASES IN BLOOD
001	ALBA BERSELIA DIAZ	NOT DETECTABLE	NOT DETECTABLE	100 UΔ pH/hour
003	JOSE DENNIS BERGARA	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
005	MARIA CARMENZA DIAL ALVAREZ	NOT DETECTABLE	NOT DETECTABLE	115 UΔ pH/hour
009	SEGUNDO ANIBAL CORDOBA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
011	RASALBA MAYA CARVAJAL	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
013	JEFER ALEXANDER LANDAZURI CORTES	NOT DETECTABLE	NOT DETECTABLE	99 UΔ pH/hour
015	ELVIA SANTACRUZ NARVAEZ	NOT DETECTABLE	NOT DETECTABLE	105 UΔ pH/hour
016	MARIA YOSLENY ENRIQUEZ SANTACRUZ	NOT DETECTABLE	NOT DETECTABLE	139 UΔ pH/hour
017	OMAIRA ISABEL SANTACRUZ NARVAEZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
018	VICTOR NELSON CUARAN TORO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
019	DIEGO LEIDER CORAL ONGUINO	NOT DETECTABLE	NOT DETECTABLE	105 UΔ pH/hour
021	JAVIER HERNANDO ERAZO BENAVIDES	NOT DETECTABLE	NOT DETECTABLE	135 UΔ pH/hour
022	ARCÁNGEL CEVALLOS YELA	NOT DETECTABLE	NOT DETECTABLE	135 UΔ pH/hour
023	ALBA LUZ PARRA GOMEZ	NOT DETECTABLE	NOT DETECTABLE	100 UΔ pH/hour
025	SANAI ABIGAIL MONOYA ROJAS	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
027	ANA LUCIA CORDOBA CERON	NOT DETECTABLE	NOT DETECTABLE	136 UΔ pH/hour
028	ULDARICO ENRIQUEZ GUERRERO	NOT DETECTABLE	NOT DETECTABLE	105 UΔ pH/hour
031	BLANCA LIGIA CAMPANA PINEDA	NOT DETECTABLE	NOT DETECTABLE	130 UΔ pH/hour
032	DINEY DIAZ CARLOSAMA	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
033	ALEIDER SOLIVER SOLARTE ORDÓNEZ	NOT DETECTABLE	NOT DETECTABLE	125 UΔ pH/hour
034	DEYANIRA DOMINGUEZ	NOT DETECTABLE	NOT DETECTABLE	135 UΔ pH/hour
035	FREDY CORAL CAMPANA	NOT DETECTABLE	NOT DETECTABLE	130 UΔ pH/hour
036	SEGUNDO ISAIS CORONEL LOPEZ	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
037	JENNY CAROLINA ZOLARTE ORDÓNEZ	NOT DETECTABLE	NOT DETECTABLE	136 UΔ pH/hour
038	GINA MARCELA ZOLARTE ORDÓNEZ	NOT DETECTABLE	NOT DETECTABLE	102 UΔ pH/hour
039	MARCELINO ORDÓNEZ GUZMAN	NOT DETECTABLE	NOT DETECTABLE	144 UΔ pH/hour
041	ALFONSO NASTACUAS	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
043	JHON FREDY CHAVEZ VALLEJO	NOT DETECTABLE	NOT DETECTABLE	124UΔ pH/hour
044	EDUARDO GILBERTO CHAVEZ BRAVO	NOT DETECTABLE	NOT DETECTABLE	131 UΔ pH/hour
045	AIDA LUCY CHAVEZ VALLEJO	NOT DETECTABLE	NOT DETECTABLE	132 UΔ pH/hour
046	JAVIER ANDRES CHAVEZ VALLEJO	NOT DETECTABLE	NOT DETECTABLE	144 UΔ pH/hour
047	LUZ ALBA VALLEJO PANTOJA	NOT DETECTABLE	NOT DETECTABLE	129 UΔ pH/hour
048	YAIKENI REYES ANASCO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
049	ERNESTO RAMOS	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
050	JOSE ERIBERTO NASTACUAS	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
051	JUAN CRISTINO CAICEDO	NOT DETECTABLE	NOT DETECTABLE	143 UΔ pH/hour
052	LEYDI JHOANA CORREA SANCHEZ	NOT DETECTABLE	NOT DETECTABLE	129 UΔ pH/hour
053	MARIA CARMEN JUAJIBIOY	NOT DETECTABLE	NOT DETECTABLE	98 UΔ pH/hour
054	JENNY JAZMINE JUAJIBIOY	NOT DETECTABLE	NOT DETECTABLE	90 UΔ pH/hour
057	SEGUNDA PORTILLA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
058	MARITZA LISETH CABRERA	NOT DETECTABLE	NOT DETECTABLE	95 UΔ pH/hour
059	MARIA DEL ROSARIO PORTILLA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
060	EDISON CAMILO ROMBACUAN	NOT DETECTABLE	NOT DETECTABLE	123 UΔ pH/hour
061	CHARLISON ELIAS MADRONERO PANTOJA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
063	JOSIAS CABRERA	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
066	MIGUEL ANONIO IBACHI MAMIAN	NOT DETECTABLE	NOT DETECTABLE	115 UΔ pH/hour
067	DANYERI REYES ANASCO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
068	PAULA ANDREA VANEGAS ORDONEZ	NOT DETECTABLE	NOT DETECTABLE	96 UΔ pH/hour
069	JULIAN MAURICIO CORDOBA	NOT DETECTABLE	NOT DETECTABLE	98 UΔ pH/hour
070	KAREN ALEXANDRA CORDOBA	NOT DETECTABLE	NOT DETECTABLE	128 UΔ pH/hour
071	DIEGO ALEJANDRO CORDOBA VANEGAS	NOT DETECTABLE	NOT DETECTABLE	126 UΔ pH/hour
073	LUZ MERCEDES CARRION CASTILLO	NOT DETECTABLE	NOT DETECTABLE	137 UΔ pH/hour
074	JENNIFER CATALINA CARRION	NOT DETECTABLE	NOT DETECTABLE	126 UΔ pH/hour
075	ECILIA URREGO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
076	AMPARO GLORIA ANACONA SANBOI	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
077	ANDRES GUACA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
078	DAYANO CORREA SANCHEZ	NOT DETECTABLE	NOT DETECTABLE	128 UΔ pH/hour
079	LUZ DARY PANTOJA	NOT DETECTABLE	NOT DETECTABLE	145 UΔ pH/hour

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080	LUZ BERTA MORALES PORTILLO	NOT DETECTABLE	NOT DETECTABLE	125 UΔ pH/hour
082	JOSE JAIME RODRIGUEZ	NOT DETECTABLE	NOT DETECTABLE	127UΔ pH/hour
CODIGO	NOMBRE	GLYPHOSATE IN URINE	PARAQUAT IN URINE	CHOLINESTERASES IN BLOOD
084	ANA RUTH QUETA CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
085	ADRIANA MIRLEY QUETA CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	100 UΔ pH/hour
086	ALYDA QUETA CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	101 UΔ pH/hour
087	MARCELA CORREA	NOT DETECTABLE	NOT DETECTABLE	132 UΔ pH/hour
088	VICTOR RICARDO HUACA	NOT DETECTABLE	NOT DETECTABLE	128 UΔ pH/hour
089	JOSE LUIS RODRIGUEZ MORALES	NOT DETECTABLE	NOT DETECTABLE	123 UΔ pH/hour
090	PAOLA ANDREA GRANDA MORALES	NOT DETECTABLE	NOT DETECTABLE	128 UΔ pH/hour
091	DUVER ANDRES RODRIGUEZ MORALES	NOT DETECTABLE	NOT DETECTABLE	101 UΔ pH/hour
092	CRISTIAN ANDRES ESPINOZA RAMOS	NOT DETECTABLE	NOT DETECTABLE	140UΔ pH/hour
093	HEIDI YESID ESPINOSA RAMOS	NOT DETECTABLE	NOT DETECTABLE	103 UΔ pH/hour
094	ESMERALDA VIVI ESPINOSA RAMOS	NOT DETECTABLE	NOT DETECTABLE	134 UΔ pH/hour
096	ANA FANNY YONDA GREGIA	NOT DETECTABLE	NOT DETECTABLE	92 UΔ pH/hour
097	INGRIT ALEXANDRA MACIA REYES	NOT DETECTABLE	NOT DETECTABLE	154 UΔ pH/hour
098	JESUS ANDERSON REYES BENAVIDES	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
099	LEYDI ROCIO RODRIGUEZ MORALES	NOT DETECTABLE	NOT DETECTABLE	134 UΔ pH/hour
100	JOSE HUMBERTO JARAMILLO VALENCIA	NOT DETECTABLE	NOT DETECTABLE	132 UΔ pH/hour
101	ELSI YARIBET PANTOJA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
102	ZORAIDA PANTOJA	NOT DETECTABLE	NOT DETECTABLE	NO HAY MUESTRA
103	CENEIDA PANOJA	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
104	YAQUELINE PANTOJA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
105	LEIDI PANOJA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
106	MARIA ILIA MORALES	NOT DETECTABLE	NOT DETECTABLE	126UΔ pH/hour
107	DERMI FERNANDO PERDOMO CAMACHO	NOT DETECTABLE	NOT DETECTABLE	103 UΔ pH/hour
108	HERNAN BERRIO PELAEZ	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
109	JOSE MIGUEL PELAEZ	NOT DETECTABLE	NOT DETECTABLE	104 UΔ pH/hour
110	NESTOR PELAEZ	NOT DETECTABLE	NOT DETECTABLE	140 UΔ pH/hour
111	MARIBEL GUERRERO HERRERA	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
112	ANGY LISET GUERRERO ROSERO	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
114	JOSE VICENTE ROCERO	NOT DETECTABLE	NOT DETECTABLE	135 UΔ pH/hour
115	MIGUEL JARAMILLO	NOT DETECTABLE	NOT DETECTABLE	139 UΔ pH/hour
117	ANDREA HIGUA	NOT DETECTABLE	NOT DETECTABLE	132 UΔ pH/hour
118	ANA ELISA HIGUA	NOT DETECTABLE	NOT DETECTABLE	143 UΔ pH/hour
119	JOSE ADAN CUARAN	NOT DETECTABLE	NOT DETECTABLE	99 UΔ pH/hour
120	BLANCA ESTELA CLAROS	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
121	YEIRA MANRAI	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
122	CRISTIDES CABRERA	NOT DETECTABLE	NOT DETECTABLE	115 UΔ pH/hour
123	KERLY GOMEZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
124	VIVIAN CASTANEDA	NOT DETECTABLE	NOT DETECTABLE	100 UΔ pH/hour
125	BLANCA DIGNA VUPAN PORTILLA	NOT DETECTABLE	NOT DETECTABLE	97 UΔ pH/hour
126	GERARDO PORTILLA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
127	GEISON ORDONEZ	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
128	GLADIS LOPEZ	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
129	ALEXIS MUNOZ	NOT DETECTABLE	NOT DETECTABLE	160 UΔ pH/hour
130	NAYIBE MUNOZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
131	MARIO PANIAGUA	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
132	HANNER A COLLAZOS	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
133	EBERT RUAREZ	NOT DETECTABLE	NOT DETECTABLE	100 UΔ pH/hour
134	LUIS MIGUEL RUAREZ	NOT DETECTABLE	NOT DETECTABLE	124 UΔ pH/hour
136	GLORIA BASTIDAS	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
137	JEFERSON CHAVEZ	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
138	ANDREI RUIZ	NOT DETECTABLE	NOT DETECTABLE	94 UΔ pH/hour
139	JENNIFER RENDON	NOT DETECTABLE	NOT DETECTABLE	99 UΔ pH/hour
140	GILBERT ORDONEZ	NOT DETECTABLE	NOT DETECTABLE	109 UΔ pH/hour
141	JULY MONTENEGRO	NOT DETECTABLE	NOT DETECTABLE	108 UΔ pH/hour
142	CERLY MILENA REVELO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
143	CARLOS MEJIA	NOT DETECTABLE	NOT DETECTABLE	156 UΔ pH/hour
144	GERMAN SALAZAR	NOT DETECTABLE	NOT DETECTABLE	158 UΔ pH/hour
145	CARLOS MEJIA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
146	ELISET ORDONEZ	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
148	DARI IVAN CATILLO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
149	DADICSON DAVIAN CASILLO	NOT DETECTABLE	NOT DETECTABLE	135 UΔ pH/hour
150	MARIA CLAUDI PINCHAO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
154	GEINER ORLANDO ERAZO	NOT DETECTABLE	NOT DETECTABLE	103 UΔ pH/hour
155	BLANCA RUANO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE

Retrospective Study on Reported Human Health Effects from Glyphosate Exposure
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156	LUIS ANTONIO CANACUAN	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
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CODIGO	NOMBRE	GLYPHOSATE IN URINE	PARAQUAT IN URINE	CHOLINESTERASES IN BLOOD
157	MARIA TRINIDAD BUENO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
158	BLANCA FANY CALDERON	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
159	DARWIN ARLEY ADARME	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
160	YERI MONGUMO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
161	RUDI ISLEIDY TONGUINO	NOT DETECTABLE	NOT DETECTABLE	109 UΔ pH/hour
162	YOLEINI YORELI MONGUMO	NOT DETECTABLE	NOT DETECTABLE	159 UΔ pH/hour
163	ELIZABETH BASTIDAS	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
164	ADRIANA BOTINA	NOT DETECTABLE	NOT DETECTABLE	156 UΔ pH/hour
165	YAMILE BOTINA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
166	MARINA CECILIA BUENO	NOT DETECTABLE	NOT DETECTABLE	125 UΔ pH/hour
167	VICTOR HUGO RAMOS	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
168	MARTA SOTELO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
169	OMERO MEJIA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
170	LUZ MARIA MENESES BASTIDAS	NOT DETECTABLE	NOT DETECTABLE	145 UΔ pH/hour
172	TERESA DE JESUS CHAPUESGAL	NOT DETECTABLE	NOT DETECTABLE	146 UΔ pH/hour
174	MARIA ABDULIA MENDUA	NOT DETECTABLE	NOT DETECTABLE	105 UΔ pH/hour
175	MARIA CLAUDIA CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	156 UΔ pH/hour
176	REMIGIO CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	132 UΔ pH/hour
177	LUCY CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	109 UΔ pH/hour
178	JESUS CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	115 UΔ pH/hour
179	JOHANY CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
180	NURY JANETH CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
181	DELCY CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	132 UΔ pH/hour
182	MELISA EPIFANIA GREFA	NOT DETECTABLE	NOT DETECTABLE	129 UΔ pH/hour
183	ENRIQUE ARTURO GREFA	NOT DETECTABLE	NOT DETECTABLE	123 UΔ pH/hour
184	BORIS ALEJANDRO GREFA	NOT DETECTABLE	NOT DETECTABLE	108 UΔ pH/hour
185	PAOLA ANDREA JOJOA	NOT DETECTABLE	NOT DETECTABLE	162 UΔ pH/hour
186	MELANIA JOJOA	NOT DETECTABLE	NOT DETECTABLE	139 UΔ pH/hour
187	JORBE ALBERTINO GREFA	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
188	MARIA SANTHA PASCAL	NOT DETECTABLE	NOT DETECTABLE	132 UΔ pH/hour
189	YOLANDA COX	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
190	MARIA EDILIA CRIOLLO	NOT DETECTABLE	NOT DETECTABLE	96 UΔ pH/hour
191	YESID HUIDIZA CHERQUISAN	NOT DETECTABLE	NOT DETECTABLE	121 UΔ pH/hour
192	GABRIELA AMANDA	NOT DETECTABLE	NOT DETECTABLE	131 UΔ pH/hour
194	FREDY ARBEY HUARAQUE	NOT DETECTABLE	NOT DETECTABLE	125 UΔ pH/hour
195	AGUSTIN RAMOS	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
196	CRISTOBAL GREFA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
197	MACARIA QUETA	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
198	MARIA MERCEDES GARCIA	NOT DETECTABLE	NOT DETECTABLE	105 UΔ pH/hour
199	JEISON ADRIAN QUETA	NOT DETECTABLE	NOT DETECTABLE	142 UΔ pH/hour
200	DAVID EMILIANO QUETA	NOT DETECTABLE	NOT DETECTABLE	102 UΔ pH/hour
201	YOSI NATALY QUETA GARCIA	NOT DETECTABLE	NOT DETECTABLE	115 UΔ pH/hour
202	LISETH JIMENA QUETA	NOT DETECTABLE	NOT DETECTABLE	123 UΔ pH/hour
203	DERLY VANESA QUETA	NOT DETECTABLE	NOT DETECTABLE	123 UΔ pH/hour
204	LESLI NAIBET MONES GREFA	NOT DETECTABLE	NOT DETECTABLE	99 UΔ pH/hour
205	ANDI VANIT MONTES GREFA	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
206	JUANA CAMILA GREFA	NOT DETECTABLE	NOT DETECTABLE	101 UΔ pH/hour
207	OLGA PATRICIA GREFA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
208	VERÓNICA ANDREA ALVARADO	NOT DETECTABLE	NOT DETECTABLE	102 UΔ pH/hour
209	YESICA ANDREA QUETA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
210	ELISEO QUETA QUINTERO	NOT DETECTABLE	NOT DETECTABLE	144 UΔ pH/hour
211	ALCIDES ARCADIO QUETA	NOT DETECTABLE	NOT DETECTABLE	146 UΔ pH/hour
212	LUIS CADENA	NOT DETECTABLE	NOT DETECTABLE	129 UΔ pH/hour
213	GESENIA ALEXANDRA FIGUEROA	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
214	LORENZA IRGORRI FIGUEROA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
215	JOSE EDIER LOPEZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
216	JASMINE ANDRIANA TAPIA	NOT DETECTABLE	NOT DETECTABLE	123 UΔ pH/hour
217	MARIA CRISTINA CHAVEZ	NOT DETECTABLE	NOT DETECTABLE	122 UΔ pH/hour
218	WILLIAM PORTILLO	NOT DETECTABLE	NOT DETECTABLE	151 UΔ pH/hour
219	CARMEN PIMIENTO	NOT DETECTABLE	NOT DETECTABLE	129 UΔ pH/hour
220	YENNY MUESE	NOT DETECTABLE	NOT DETECTABLE	150 UΔ pH/hour
221	FREDY MUESES	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
222	LORENA MUESES	NOT DETECTABLE	NOT DETECTABLE	122 UΔ pH/hour
223	CECILIA PINCHAO	NOT DETECTABLE	NOT DETECTABLE	123 UΔ pH/hour
224	JONATHAN TAQUEZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE

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CODIGO	NOMBRE	GLYPHOSATE IN URINE	PARAQUAT IN URINE	CHOLINESTERASES IN BLOOD
225	HERNANDO PINCHAO	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
226	MARIA VIRGINIA CHAVEZ	NOT DETECTABLE	NOT DETECTABLE	108 UΔ pH/hour
227	ANA YELA	NOT DETECTABLE	NOT DETECTABLE	98 UΔ pH/hour
228	DEISI DIANA VASQUEZ	NOT DETECTABLE	NOT DETECTABLE	100 UΔ pH/hour
229	MARIA EUGENIA PANTOJA	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
230	CORNELIA ORTEGA	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
231	JOHANA ELIZABETH LOPEZ	NOT DETECTABLE	NOT DETECTABLE	125 UΔ pH/hour
232	MELBA PORTILLA	NOT DETECTABLE	NOT DETECTABLE	109 UΔ pH/hour
235	ALEXIS MALPUD	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
236	RUBY MARLEN YELA	NOT DETECTABLE	NOT DETECTABLE	115 UΔ pH/hour
237	CLAUDIA LORENA BERGARA	NOT DETECTABLE	NOT DETECTABLE	130 UΔ pH/hour
238	JESUS ANIBAL BERGARA	NOT DETECTABLE	NOT DETECTABLE	150 UΔ pH/hour
239	DERCY ANDREA BERGARA	NOT DETECTABLE	NOT DETECTABLE	140 UΔ pH/hour
240	RUBY AIDE BERGARA	NOT DETECTABLE	NOT DETECTABLE	145 UΔ pH/hour
241	CLAUDIA MARCELA CAICEDO	NOT DETECTABLE	NOT DETECTABLE	144 UΔ pH/hour
242	JONATAN JAVIER CAICEDO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
243	ESLENI FERNANDA CAICEDO	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
244	JENNY IBANEZ	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
245	AIDA MARIA MUNOZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
246	LUZ DARI ARAUJO	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
247	ANA MARCELA MADRONERO	NOT DETECTABLE	NOT DETECTABLE	99 UΔ pH/hour
248	KEVIN JULIAN FIGUEROA	NOT DETECTABLE	NOT DETECTABLE	109 UΔ pH/hour
249	NELI ELVIRA GUALMATAN	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
250	DIANA ELISABETH TAPIA	NOT DETECTABLE	NOT DETECTABLE	160 UΔ pH/hour
251	JOSE TAPIA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
252	GRISELDA DELGADO	NOT DETECTABLE	NOT DETECTABLE	144 UΔ pH/hour
253	ESNEIDER PANTOJA	NOT DETECTABLE	NOT DETECTABLE	146 UΔ pH/hour
254	BLANCA NIDIA BASANTE	NOT DETECTABLE	NOT DETECTABLE	95 UΔ pH/hour
255	RENAL ALBEIRO IGUA	NOT DETECTABLE	NOT DETECTABLE	99 UΔ pH/hour
256	DAIRA MAFLA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
257	YESICA JULIANA MAFLA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
258	HENRY LOPEZ	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
259	ALEXANDRA DIAZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
260	LISBETH YURANI MORALES	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
261	NEIDER RAMIRO MONTOYA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
262	YICET GABRIELA MONTOYA	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
263	CARMEN NARVAEZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
264	ARACELI ZULEMI URRESTI	NOT DETECTABLE	NOT DETECTABLE	111 UΔ pH/hour
264	DIANA YANEILI MORALES	NOT DETECTABLE	NOT DETECTABLE	109 UΔ pH/hour
266	AURA MARINA CANTUCAR	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
267	AURINO URRESTI	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
268	JUVENCIA IBANEZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
269	ESTER BENAVIDES	NOT DETECTABLE	NOT DETECTABLE	108 UΔ pH/hour
270	DAYANA LISETH IBANEZ BENAVIDES	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
271	ZOILA PORTILLA	NOT DETECTABLE	NOT DETECTABLE	109 UΔ pH/hour
272	EDISON JESUS BERGARA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
273	OTILIA GOLLEZ	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
274	ROSA ELENA INSUASTI	NOT DETECTABLE	NOT DETECTABLE	155 UΔ pH/hour
275	LUIS EDMUNDO ROSERO	NOT DETECTABLE	NOT DETECTABLE	160 UΔ pH/hour
276	ANA VELLY GUERRERO VELLO	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
277	OMAR FERNANDO CORDOBA GUERRERO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
278	LIDIA ESPERANZA ESTRADA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
279	YOZMAIRA YUZARO ESTRADA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
280	EDWIN ALBEIRO MONTOYA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
281	CLAUDIA LORENA MONTOYA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
282	NANCY ROCIO ORTEGA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
283	DORIS MEJIA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
284	ZANIER ORTEGA	NOT DETECTABLE	NOT DETECTABLE	150 UΔ pH/hour
285	EMILIA SALAS	NOT DETECTABLE	NOT DETECTABLE	160 UΔ pH/hour
286	ROSA LAUDINA IBANEZ	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
287	JOSE SALAS	NOT DETECTABLE	NOT DETECTABLE	99 UΔ pH/hour
288	NORBERTA PATINO	NOT DETECTABLE	NOT DETECTABLE	96 UΔ pH/hour
289	NELSY NAYIBE CAICEDO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
290	MARGARITA DIAZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
291	JAMES ROBINSON CAICEDO	NOT DETECTABLE	NOT DETECTABLE	100 UΔ pH/hour

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CODIGO	NOMBRE	GLYPHOSATE IN URINE	PARAQUAT IN URINE	CHOLINESTERASES IN BLOOD
292	ANGI PAOLA CAICEDO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
293	DANIELA CASANOVA	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
294	ANIBAL CASANOVA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
301	IVON YESENIA PENAGOS SALAS	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
302	FLORALBA RUEDA	NOT DETECTABLE	NOT DETECTABLE	104 UΔ pH/hour
303	DOLORES BENAVIDEZ	NOT DETECTABLE	NOT DETECTABLE	159 UΔ pH/hour
304	OLGA CHAMORRO	NOT DETECTABLE	NOT DETECTABLE	113 UΔ pH/hour
305	ISABEL DEL SOCORRO LOPEZ	NOT DETECTABLE	NOT DETECTABLE	118 UΔ pH/hour
306	MARIA DEL ROSARIO LOPEZ	NOT DETECTABLE	NOT DETECTABLE	121 UΔ pH/hour
307	LUIS CALISTO PINCHAO ARDILA	NOT DETECTABLE	NOT DETECTABLE	126 UΔ pH/hour
310	DIELA DEL PILAR TAQUEZ	NOT DETECTABLE	NOT DETECTABLE	154 UΔ pH/hour
312	DIANA MARICEL YANDUN	NOT DETECTABLE	NOT DETECTABLE	167 UΔ pH/hour
313	ROBERT ALEJANDRO YANDUN	NOT DETECTABLE	NOT DETECTABLE	136 UΔ pH/hour
314	OMAIRA MORALES	NOT DETECTABLE	NOT DETECTABLE	162 UΔ pH/hour
315	MERCEDES MORALES	NOT DETECTABLE	NOT DETECTABLE	117 UΔ pH/hour
317	YULIET ROSAS	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
320	NANCY BURBANO ANAME	NOT DETECTABLE	NOT DETECTABLE	134 UΔ pH/hour
321	CARLOS CASANOVA	NOT DETECTABLE	NOT DETECTABLE	130 UΔ pH/hour
322	EIDER MAURICIO PINCHAO	NOT DETECTABLE	NOT DETECTABLE	114 UΔ pH/hour
323	WLADIMIR PINCHAO	NOT DETECTABLE	NOT DETECTABLE	136 UΔ pH/hour
324	CLODOMIRO PINCHAO	NOT DETECTABLE	NOT DETECTABLE	158 UΔ pH/hour
327	JESUS ARLANO ROSAS	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
328	DESY YURANI ROSAS	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
330	ARLEY ROSAS	NOT DETECTABLE	NOT DETECTABLE	128 UΔ pH/hour
331	CLARA ELENA REINA	NOT DETECTABLE	NOT DETECTABLE	113 UΔ pH/hour
332	ZULY MARYORI LOPEZ	NOT DETECTABLE	NOT DETECTABLE	158 UΔ pH/hour
333	LUIS ANGEL LOPEZ	NOT DETECTABLE	NOT DETECTABLE	116UΔ pH/hour
334	GLORIA CHABUEZA	NOT DETECTABLE	NOT DETECTABLE	128 UΔ pH/hour
336	CONCEPCION VERDUGO	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
337	ROBINSON LOPEZ	NOT DETECTABLE	NOT DETECTABLE	161 UΔ pH/hour
338	MARIA WEBLEG CHARAN	NOT DETECTABLE	NOT DETECTABLE	129 UΔ pH/hour
339	WILLIAM ANDRES CUASPA	NOT DETECTABLE	NOT DETECTABLE	135 UΔ pH/hour
340	HECOR LUCIANO CUASPA	NOT DETECTABLE	NOT DETECTABLE	108 UΔ pH/hour
341	LUCIANO CUASPA	NOT DETECTABLE	NOT DETECTABLE	153 UΔ pH/hour
342	CATERINE ESTRADA	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
343	NANCY SALAS	NOT DETECTABLE	NOT DETECTABLE	129 UΔ pH/hour
344	YESIKA JIMENA CASMO	NOT DETECTABLE	NOT DETECTABLE	120UΔ pH/hour
345	JAVIER CASMO	NOT DETECTABLE	NOT DETECTABLE	103 UΔ pH/hour
346	JOSE MIGUEL CHARAN	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
347	LUIS ANTONIO CHARAN	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
348	MARYURIC RAMIREZ GALLARDO	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
349	ROXANA QUIMAYAS	NOT DETECTABLE	NOT DETECTABLE	108 UΔ pH/hour
350	BRISBANI MARTINEZ	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
351	ESPERANZA CASANOVA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
352	ZENEILA CASANOVA	NOT DETECTABLE	NOT DETECTABLE	110 UΔ pH/hour
353	ROSA APOLONIA GALARZA	NOT DETECTABLE	NOT DETECTABLE	122 UΔ pH/hour
354	FREDY MARTINEZ	NOT DETECTABLE	NOT DETECTABLE	124 UΔ pH/hour
355	ONESIMO CASANOVA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
356	JOSE CASANOVA	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
357	AURA CASANOVA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
358	HILDARDO CASANOVA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
359	WILSON ARGEMIRO BURGOS	NOT DETECTABLE	NOT DETECTABLE	160 UΔ pH/hour
360	YENNY YAMILE BURGOS	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
361	JUANA ESTER PERENGUEZ	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
362	CARLOS ALBERTO MUESE	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
363	PATRICIA URRESTI	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
364	DUVER CHAMUESA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
365	LIDIA YANETH GARCIA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
366	LIDIA YANETH GARCIA	NOT DETECTABLE	NOT DETECTABLE	125 UΔ pH/hour
367	SANDRA MILENA CUASPA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
368	LUIS ARLEY CUASPA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
369	YURI MARISELCUASPA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
370	DIANA CAROLINA CUASPA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
371	EDITH NELLY MISMASA	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
372	YENIT YAMILE TAQUEZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE

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CODIGO	NOMBRE	GLYPHOSATE IN URINE	PARAQUAT IN URINE	CHOLINESTERASES IN BLOOD
373	DIANA PAOLA TAQUEZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
374	SOCORRO MONTENEGRO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
375	MARIA ELENA MISNASA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
376	JONATAN MONTENEGRO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
377	ELISENIA ORINASA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
378	MARIA ELENA CHAPID	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
379	JHON FREDY CHAQUESA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
380	JERÓNIMO MESIAS	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
381	GLORIA MUESES	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
383	MARIA PIEDAD MUESES	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
384	CIELO MUESES	NOT DETECTABLE	NOT DETECTABLE	126 UΔ pH/hour
385	FANNY YANIRA PINCHAO	NOT DETECTABLE	NOT DETECTABLE	157 UΔ pH/hour
386	MIRIAN MARLENE PINCHAO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
387	DORIS ARACELI PINCHAO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
388	GLADIS MARLENE CHAGUEZA	NOT DETECTABLE	NOT DETECTABLE	127 UΔ pH/hour
390	AMINTO ARLEY TORGUINO	NOT DETECTABLE	NOT DETECTABLE	127 UΔ pH/hour
391	MARIA GENIT TONGUINO	NOT DETECTABLE	NOT DETECTABLE	135 UΔ pH/hour
392	ELMER FERNANDO TONGUINO	NOT DETECTABLE	NOT DETECTABLE	115 UΔ pH/hour
393	HENRY DANIEL TONGUINO	NOT DETECTABLE	NOT DETECTABLE	156 UΔ pH/hour
394	MAYERLY TORGUINO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
395	LEIDI NATALI CHAVEZ	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
396	ANGEL CULDER	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
397	LISANDRO CHAPID	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
398	ANA RUBI CRUZ MEJIA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
399	TOVIAS BETANCUR	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
400	OLIVER ALEXANDER BETANCUR	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
401	ELKIN EMERSON URRESTI	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
402	OSWALDO CORDOBA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
403	MARINA ROSERO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
404	ANGIE PAOLA CORDOBA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
405	SONIA MUESES	NOT DETECTABLE	NOT DETECTABLE	151 UΔ pH/hour
406	BEYAN KEVIN JURADO	NOT DETECTABLE	NOT DETECTABLE	92 UΔ pH/hour
407	ANGELA GERALDINE JURADO	NOT DETECTABLE	NOT DETECTABLE	103 UΔ pH/hour
408	GLORIA E. CUARA	NOT DETECTABLE	NOT DETECTABLE	160 UΔ pH/hour
409	MARIA CUARA INBACUA	NOT DETECTABLE	NOT DETECTABLE	159 UΔ pH/hour
410	CLAUDIA CRISTINA URRESTI	NOT DETECTABLE	NOT DETECTABLE	138 UΔ pH/hour
411	DELSY ELISABETH JURADO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
412	ELINA AGUIRRE	NOT DETECTABLE	NOT DETECTABLE	103 UΔ pH/hour
413	GLORA DIAZ	NOT DETECTABLE	NOT DETECTABLE	103 UΔ pH/hour
414	LUIS JAIME JURADO	NOT DETECTABLE	NOT DETECTABLE	119 UΔ pH/hour
415	ANDERSON JAVIER JURADO	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
416	MARIA ROSAURA RAMÍREZ	NOT DETECTABLE	NOT DETECTABLE	99 UΔ pH/hour
417	MARIA MERCY NARVÁEZ	NOT DETECTABLE	NOT DETECTABLE	156 UΔ pH/hour
418	JENNY EMILSE MUESES	NOT DETECTABLE	NOT DETECTABLE	93 UΔ pH/hour
419	NILSA AMANDA ACOSTA	NOT DETECTABLE	NOT DETECTABLE	143 UΔ pH/hour
421	MARIA DORIS QUIROZ	NOT DETECTABLE	NOT DETECTABLE	145 UΔ pH/hour
426	GLORIA CABRERA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
428	SANDRA TORRES	NOT DETECTABLE	NOT DETECTABLE	120 UΔ pH/hour
442	JENNY VALLEJO	NOT DETECTABLE	NOT DETECTABLE	96 UΔ pH/hour
451	OMAR HERNÁNDEZ	NOT DETECTABLE	NOT DETECTABLE	92 UΔ pH/hour
452	NORA NOGUERA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
480	BLANCA ALBINA SARTA GREJA	NOT DETECTABLE	NOT DETECTABLE	95 UΔ pH/hour
481	SILDA MARIA SARTA GREJA	NOT DETECTABLE	NOT DETECTABLE	116 UΔ pH/hour
482	MARIA HELENA SARTA GREJA	NOT DETECTABLE	NOT DETECTABLE	101 UΔ pH/hour
483	HILMER EDINSON SARTA GREJA	NOT DETECTABLE	NOT DETECTABLE	109 UΔ pH/hour
484	LENY ANGELA SARTA GREJA	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
488	MERCEDES GREJA AGUINDE	NOT DETECTABLE	NOT DETECTABLE	NO SAMPLE
489	ALEGRIA AGUINDE ABELLO	NOT DETECTABLE	NOT DETECTABLE	93 UΔ pH/hour