

# **ENVIRONMENTAL CONTAMINATION IN THE HOMES OF LA OROYA AND CONCEPCION AND ITS EFFECTS IN THE HEALTH OF COMMUNITY RESIDENTS**

**A study conducted by the Saint Louis University School of Public Health  
in partnership with the Archdiocese of Huancayo, Peru**

## **EXECUTIVE SUMMARY**

### **(1) BACKGROUND**

The School of Public Health at Saint Louis University has conducted a scientific study entitled “Environmental Contamination in the Homes of La Oroya and Concepcion, Peru, and its Effects in the Health of Community Residents.” The purpose of this study is to determine the levels of heavy metals such as lead, cadmium and arsenic and other toxic elements in the bodies of residents and in their homes. This study was requested by the Archdiocese of Huancayo, Peru, and was approved by the Peruvian Health Ministry and Saint Louis University Institutional Review Board. It complies with all applicable norms and regulations in United States and Peru.

This is a comparative study between a study site and a control site. La Oroya was selected as the study site because of the serious levels of environmental contamination from lead, arsenic, cadmium and other contaminants produced by the Doe Run-owned metallurgical complex. The ambient contamination caused by these toxic metals has been documented. Concepción was selected as the control site because it has similar characteristics to La Oroya but does not have a metallurgical complex and, therefore, hypothetically, is unlikely to have levels of contamination as serious as those in La Oroya.

La Oroya is a town of 35,000 inhabitants located in the Peruvian Andes in an area rich in lead, copper, zinc, silver, and gold. The extraction and smelting of these metals has been La Oroya primary economic activity for decades. La Oroya mining complex was owned and operated by the Peruvian government until 1997 when it was sold to the Doe Run Co., the largest producer of lead in the U.S. with headquarters in Missouri. La Oroya mining complex is now known as Doe Run Peru.

Several studies have documented the severe environmental contamination caused by the mining industry in La Oroya. For instance, in 1999 the Peruvian Ministry of Health found that 99.1% of children suffered from lead poisoning and that 20% of these children needed urgent medical care due to the extremely high blood lead levels. Also, a 2002 report entitled “La Oroya Cannot Wait” described the very serious levels of ambient contamination of air, soil, and water in La Oroya. The findings in this report indicate that over 80% of blood lead levels in La Oroya children were two and three times greater than the level of concern of 10 µg/dl established by the CDC in the U.S. In addition, the report found that arsenic, cadmium, suspended particles, and sulfur dioxide (SO<sub>2</sub>) exceed international acceptable levels and pose serious health risks to the community. The toxicity of lead, cadmium and arsenic has been scientifically established and is well documented in the medical and public health literature.

The studies mentioned above provide important information of the extent of the environmental contamination affecting La Oroya and blood lead levels in the population. However, there was

no evidence on levels of cadmium, arsenic and other heavy metals and toxic elements associated with the mining and smelting operations in residents and in their homes. The goal of this study is to provide this evidence to Peruvian authorities, concerned organizations, and community residents with the hope that it helps them make better decisions to prevent exposure to toxic metals, protect the public's health and promote environmental protection.

In August 2005 Saint Louis University researchers teamed up with Peruvian physicians and research assistants to collect biological and environmental samples to determine levels of contamination. The Centers for Disease Control and Prevention, CDC, analyzed the biological samples and provided the first results of the levels of lead, cadmium, arsenic and other toxic elements found in blood and urine samples of study participants. Following is a summary of the CDC findings.

## **(2) FIRST REPORT OF BIOLOGICAL RESULTS**

### **1. CONFIRMATION OF EXTREMELY HIGH BLOOD LEAD LEVELS**

Study results confirm what has been found in previous blood lead screenings: the percentages of children with elevated blood lead levels are extremely high. 97% of children between 6 months and six years of age and 98% of children between seven and 12 years have elevated blood lead levels. According to the CDC an elevated level is any level equal to or greater than 10 µg/dl (micrograms of lead per deciliter of blood). Also this study is the first to report elevated blood lead levels in other age groups. **For instance, 71% of children between 13 and 18 years of age and 69% of residents over 18 have elevated blood lead levels.**

The epidemic of lead exposure is even more serious in La Oroya Antigua, the urban area closest to the smelter where 73% of children between 6 months and six years of age were found with levels between 20 and 44 µg/dl, and 23% were found with levels higher than 45 µg/dl. The CDC considers levels equal to or greater than 45µg/dl a medical emergency requiring immediate medical attention.

### **2. NEW INFORMATION ON LEVELS OF CADMIUM, ARSENIC AND OTHER TOXIC ELEMENTS**

La Oroya's population registered blood cadmium levels more than three times the U.S. average, and urine cadmium more than six times the U.S. average. Cadmium, a by-product of the smelting process, is a heavy metal which previous studies have associated with lung and prostate cancer and kidney disease and failure.

**The levels of arsenic found in La Oroya residents are twice as much as those found in Concepcion, the control site.** These levels could not be compared to a U.S. average because the CDC has not reported this average. Nevertheless, the health concerns with arsenic remain as it has been shown to cause respiratory problems, skin lesions, nausea and vomit. Also, lead, cadmium and arsenic have been classified as potentially carcinogenic elements.

The level of antimony in La Oroya's population was thirty times higher than the average level in the U.S. population. Elevated levels of antimony have been shown to cause heart and lung disease, and may be linked to genetic and developmental abnormalities, as well as lung cancer.

### 3. CONTAMINATION FOUND IN CONCEPCION

The Saint Louis University research team did not expect to find elevated levels of contaminants in Concepción, a city known as the ecological capital of the Mantaro River Valley, which is located 70 miles downriver and downwind from the city of La Oroya. The Mantaro Valley produces a significant portion of the vegetables, grains and dairy products consumed by nine million people in Lima, Peru's capital.

However, the study results indicate elevated levels of lead in Concepción. Approximately 24% of children between six months and six years of age have elevated blood lead levels. Also, Concepción's population showed cadmium levels a full 50% above the U.S. average level.

These results suggest that the problem of environmental contamination and its effects in community health is not confined to La Oroya but has a regional character involving the Mantaro River valley.

### 4. THE PROBLEM OF COMBINED EXPOSURE TO TOXIC ELEMENTS

The levels of heavy metals and other toxic elements found in blood and urine samples in La Oroya and Concepcion raises the question of health effects due to the combined exposure to these elements. Individually, the heavy metals analyzed in this study are capable of causing significant damage. When taken together, in what La Oroya residents call their daily "toxic cocktail," it is reasonable to expect that the combined action of these heavy metals can increase the health risks of all those exposed.

### CONCLUSION: THE URGENT NEED FOR EFFECTIVE PREVENTION

The evidence of elevated levels of lead, cadmium, arsenic and other toxic metals in the bodies of residents in study sites indicate that there is an extremely serious environmental health crisis affecting La Oroya, especially vulnerable populations such as young children. From a community health perspective, the solution is no other but effective prevention at all levels emphasizing primary prevention in the first place. Primary prevention requires the control of the contamination source, the Doe Run Peru metallurgical complex, and the reduction of emissions of heavy metals into the environment. Children and all residents in La Oroya and Concepcion should not have to wait decades to experience a significant decrease of the levels of contamination that afflict them now.

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