CAMEROON

NATIONAL REPORT:
LEAD IN ENAMEL DECORATIVE PAINTS IN CAMEROON

2015

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ACKNOWLEDGEMENTS

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This report was produced as part of the Africa Lead Paint Elimination Project. The Africa Lead Paint Elimination Project carries out focused activities to eliminate lead in paint in four project countries – Cameroon, Ethiopia, Ivory Coast, and Tanzania.

The project is funded by the Global Environment Facility; the United Nations Environment Programme (UNEP) is the Project Implementing Agency; and IPEN is the Project Executing Agency. The contents of this booklet, however, are the sole responsibility of IPEN and Centre de Recherche et d'Education pour le Développement (CREPD).

CREPD is a Cameroon-based Health and Environmental NGO aiming to bridge the gap between science and action in sub Sahara Africa and beyond. Established in 2004, CREPD is a unique NGO within Cameroon with a technical scientific background and is a well respected resource for government ministries on chemicals management issues. The organization serves on a number of advisory committees and has an excellent working relationship with government, research institutions, and other stakeholders. CREPD also has a successful track record in obtaining multi-year funding from international funders and in executing projects as envisioned.

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PREFACE

Leaded paints for home use continue to be widely produced, sold, and used in developing countries despite the fact that most highly industrial countries banned leaded paints for household use more than 40 years ago. IPEN, the United Nations Environment Programme (UNEP), the World Health Organization (WHO), and others are cooperating to raise awareness that childhood lead exposure remains a serious problem, and have catalyzed national activity in a number of developing countries to eliminate lead paint and protect children.

In 2007 and 2008, NGOs in the IPEN network collected and analyzed solvent-based, enamel decorative paints on the market in 11 developing countries, and in countries with economies in transition. The results were startling. In every one of these countries, many of the paints had dangerously high lead content. In response, IPEN launched a worldwide lead paint elimination campaign. Since then, IPEN-affiliated NGOs and others have sampled and analyzed paints on the market in approximately 40 low- and middle-income countries.[1] Twelve of these studies were carried out with UNEP support.[2]

This report presents new data on the lead content of solvent-based, enamel decorative paints that are offered for sale in the Cameroon market. This is the third time that CREPD has analyzed paints sold in Cameroon for their lead content. In collaboration with OK International and with funding from the SAICM/QSP TF and the Conservation, Food and Health Foundation in USA, previous studies were conducted in:

- 2011. 60 solvent-based enamel paint samples from 15 manufacturers, including 4 major manufacturers representing about 90% of market share. In this study 67% of paints had lead concentrations greater than 90 ppm, among which 98% had levels of lead above 600 ppm. The highest concentration of lead was 500 000 ppm (50% lead by weight). In the same study, 33% of the paint samples contained no intentionally added lead (i.e., lead content was less than 90 ppm).
- 2013. 32 paint samples from 4 major manufacturers (3 local and 1 foreign) were sampled in 2013 in order to assess progress following promises made by manufacturers in 2011 to reformulate their products. In this study, the percentage of paints with high lead levels marketed in Cameroon decreased from 67% to 50%. This improvement was due to CEP/Seigneurie reformulating its paint following a joint call signed in 2012 with CREPD to work

1 Information about the indicated countries and studies is provided in Annex A of this report.
2 Ibid.

together towards the elimination of lead paint in Cameroon. In addition, CREPD was successful in encouraging CEP/Seigneurie to voluntarily recall for disposal a significant quantity of lead paint that had been in distribution in stores. At a national workshop organized in 2014, the company made a presentation stating that it has taken back more than 3.7 metric tons of paint products and held back 8.4 metric tons of lead-containing pigment from production in their warehouse for "decommissioning" or eventual disposal.

- CREPD was able to verify this claim and visited the storage site for this waste material in the company's warehouse during a site visit. This is, to our knowledge, the first time that any paint company in Cameroon has provided documentation and quantities of lead-containing products that have been taken off the market and raw materials that have been set aside for disposal as hazardous waste.

This report also presents background information on why the present and former use of enamel decorative paints with high lead content is a source of serious concern, especially to children's health. It also proposes action steps by different stakeholders to protect children and others from lead paint and lead dust.

The report was prepared by CREPD with support and assistance from the African Lead Paint Elimination Project, which was established to eliminate lead in paint and raise widespread awareness among business entrepreneurs and consumers about the adverse human health impacts of lead-based paints, particularly on the health of children under six years old.

EXECUTIVE SUMMARY

While lead exposure is also harmful to adults, lead exposure harms children at much lower doses, and the health effects are generally irreversible and can have a lifelong impact.[3] The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate.[4] The human fetus is the most vulnerable, and a pregnant woman can transfer lead that has accumulated in her body to her developing child. Lead is also transferred through breast milk when lead is present in a nursing mother.

According to WHO, "Lead has no essential role in the human body, and lead poisoning accounts for about 0.6% of the global burden of disease."[5] Evidence of reduced intelligence caused by childhood exposure to lead has led the World Health Organization (WHO) to list "lead-caused mental retardation" as a recognized disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental factors.[6]

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints—the paints used on the interiors and exteriors of homes, schools, and other child-occupied facilities—beginning in the 1970s and 1980s. Many also imposed controls on the lead content of paints used on toys and for other applications likely to contribute to lead exposure in children. These regulatory actions were taken based on scientific and medical findings that lead paint is a major source of lead exposure in children, and that lead exposure in children causes serious harm, especially to children aged six years and under. Exposure to lead also harms adults, especially those working in occupations associated with high lead exposure. Lead in paint can contribute to high occupational lead exposure in painters, auto body shop workers, construction workers involved in building renovations, and others.

In 2015, staff at CREPD collected 54 solvent-based, enamel decorative paints from 21 brands sold on the market in Cameroon as part of the African Lead Paint Elimination Project. A 2011 paint market survey and this 2015 survey demonstrate that the Cameroon paint market is composed of local and imported paints. Specific brand names, manufacturers, and countries of origin of the imported paints vary greatly within small elapsed times as indicated by consecutive surveys conducted since 2011. But this variation does not affect overall

3 Ibid, page 12
4 Ibid, page 48
5 World Health Organization, Childhood Lead Poisoning, 2010, page 11: http://www.who.int/ceh/publications/leadguidance.pdf
6 A. Prüss-Üstün and C. Corvalán, World Health Organization, Preventing Disease Through Healthy Environments: Towards an estimate of the environmental burden of disease, 2006, page 12: http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

market share, which seems to be consistent and is dominated by 4 manufacturers (3 local and 1 foreign).

The Africa Lead Paint Elimination Project carries out focused activities to eliminate lead in paint in four project countries — Cameroon, Ivory Coast, Ethiopia, and Tanzania. The project is funded by the Global Environment Facility; the United Nations Environment Programme (UNEP) is the Project Implementing Agency; and IPEN is the Project Executing Agency.

FINDINGS

In 2015, CREPD purchased a total of 54 cans of solvent-based, enamel decorative, anti-corrosive and automotive paints from stores in Yaoundé and Douala, respectively, in the Centre and Littoral Regions of Cameroon. The paints were classified as follows:

- 29 locally manufactured (including the subsidiary of multinational paint manufacturers) paints, representing 8 brands (54% of the entire sample set)
- 25 imported paint samples from foreign countries in North Africa, European Union, South America and Middle East, representing 12 brands (46% of the entire sample set).

The paints were from 21 paint brands and brand holders among which 8 were local brands, 12 were imported brands and one brand where data on country origin could not be determined. Samples from all the paints were analyzed for their total lead content (dry weight) using the EPA 3050B/7420 method reference by the Forensic Analytical Laboratories, an accredited laboratory in the USA.

Lead Levels in Paint

More than half of the decorative paints analyzed would not meet the regulatory standard established in most industrialized countries.
Samples from 19 of 35 decorative paints analyzed (54%) contained lead at levels above 90 parts per million (ppm, based on dry weight of the paint); samples from 18 paints out of those 19 had a lead content above 600 ppm; and samples from eight paints contained dangerously high lead levels at 10,000 ppm or above. Sixteen paints, representing 46% of the decorative paint samples, contained lead levels at 90 ppm or below, the regulatory standard in the United States, and could be sold anywhere in the world.

Samples from 3 of 12 anticorrosive paints (25%) contained more than 90 ppm lead; 2 of these 3 had lead content above 600 ppm. Eight of the 12 anticorrosive paints (67%) contained lead levels below 90 ppm; and one anticorrosive paint sample had a lead level of 90 ppm.

Samples from 5 of 7 automotive paints (71%) contained lead levels above 90 ppm and above 600 ppm as well; 3 samples of those 5 had lead levels above 10,000 ppm with a maximum of 85,000 ppm lead. Two automotive paints (29%) had lead levels below 90 ppm.

Some major manufacturers are producing paints with low lead levels.
Samples from all three decorative paints from the largest local manufacturer (CEP/Seigneurie) contained less than 90 ppm lead. Samples from the second larger manufacturer (Smalto) showed that 3 (38%) of its 8 decorative paints contained less than 90 ppm lead, while all four decorative paints analyzed from INODA's Rossignol (three enamel decorative paints) and Universal (one white enamel decorative) brands contained less than 90 ppm lead. There was no decorative paint available from the third largest manufacturer (SOCIPEC) because this company manufactures mainly water-based paints and the few solvent-based paint produced are in large capacity containers. Two decorative paints from a local smaller size enterprise, namely Pelican did not meet the regulatory standard.

Seven out of a total of 9 samples (78%) of anticorrosive paints from the local manufacturers (CEP/Seigneurie, Smalto, Littocal, Forex and Camero-peint) meet the 90 ppm standard; while 2 out of a total of 3 imported paints (66%) meet the 90 ppm standard.

Two out of a total of 3 automotive paint samples from the manufacturer CEP/ Seigneurie had lead content below 90 ppm. In contrast, all 4 of the imported automotive paints (Colorado and Prodec from Morocco) had a lead content between 640 – 85,000 ppm.

Lead Levels by Brand

Locally produced paints are more likely to meet international standards than imported paints.
When data from similar studies conducted in 2011 an 2013 are compared to data in this study, it appears that there is a downward trend in lead content in paint marketed in Cameroon. This has occurred primarily because major local manufacturers have completely or partially reformulated their products. The majority of imported paints, however, continue to produce paint with lead levels above 90 ppm. Of the 3 major, local manufacturers, the percentage of paint

samples with lead content less than 90 ppm were as follows: 100% for INODA, 86% for CEP/seigneurie, and 44% for Smalto. The 2 paints sampled from Littocol, a local manufacturer producing only anticorrosive paints, contained lead below 90 ppm. Limited samples from the smaller size enterprises do not allow a conclusive opinion, but, apart from SOCIPEC, 100% of the samples from smaller size enterprises (SOQUICAN, Ferox, Pelican) had a lead content greater than 90 ppm.

For the imported paint brands, 33% of National (UAE) samples were below 90 ppm; 0% of Continental (Algeria) samples were below 90 ppm; 0% of Prodec (Morocco) samples were below 90 ppm; 0% of Simpex (EU/EC) samples were below 90 ppm; and 100% of Nespoli (Italy) samples had lead content below 90 ppm.

Lead Levels by Color

Bright colors (e.g., yellow, green, red) had the highest lead content, irrespective of the brand, manufacturer and the country of origin.
Including all types of paint, the yellow paints have the highest content of lead. In this study, 4 out of a total of 8 yellow paints analyzed contained lead at levels above 10,000 ppm. The remaining 4 paints contained low lead levels, below 90 ppm. The maximum concentration in a yellow paint was 85,000 ppm.

Green paints also had high lead content. A total of 8 green paints were analyzed in this study and 4 had high lead concentrations above 10,000 ppm. Two green paints contained lead below 90 ppm. The highest level detected in a green paint was 56,000.

Some of the red paints had a high lead content. Of the 12 red paints analyzed in this study, 7 had above 600 ppm lead and 2 had levels at or above 10,000 ppm lead. The highest lead level detected in a red paint was 11,000 ppm.

Though red-brown and blue paints had lower lead concentrations, many of these paints still had dangerously high lead levels. One of 9 brownish (red brown, brown red, brown and red oxide) samples contained a lead concentration of 10,000 ppm, and all blue paints contained lead levels below 10,000. The maximum lead level detected in the group of paints with brownish color was 10,000 ppm and 9,800 in a blue paint.

Lead levels for the white and grey paints ranged from below 60 ppm to 6,200 ppm.

Consumer Information

Paint labels for only one company — CEP/Seigneurie — included information about lead content and lead hazard.

The CEP/Seigneurie label clearly indicates that the paint product bearing it contains less than 90 ppm lead. With the exception of one automotive sample labeled no lead (which contained 45,000 ppm lead), all paints bearing this label by CEP/Seigneurie tested below 90 ppm. This is the result of voluntary reform implemented by CEP/Seigneurie, the largest manufacturer of paint products in Cameroon, and is good progress toward "Right to Know". Two other brands (Continental, an imported brand by SARL Devco Co. Algeria and International Trust, manufactured in Lebanon and which carries the CE mark, indicating that it meets the standard of the European Union.), also included information about lead on their cans. Unfortunately the cans carrying these labels contained paints with 2,100 and 2,600 ppm lead respectively.

Nevertheless, 83% of paint cans in this study have no labeling with regard to lead. This result indicates that people will continue to be exposed to lead poisoning from many paints as long as there is no informative paint labeling with special emphasis on lead content for all paints sold in Cameroon, and people remain uneducated on the hazards of lead paint.

RECOMMENDATIONS

Voluntary Action and Labelling

Until a national lead paint control regime is in place, all paint manufacturers should act voluntarily to eliminate lead compounds in the formulation of their paints.

Paint manufacturers that currently produce enamel decorative paints and lead paints for other applications that are likely to contribute to childhood lead exposure are encouraged to reformulate these paints to avoid the use of leaded ingredients.

Lead paint is a serious human health hazard, especially when the paint is used in applications likely to expose children to lead. Enamel decorative paints and paints for use on children's products can be easily produced without the use of lead pigments, lead driers, and lead anti-corrosive agents. Manufacturers can reformulate their paints to avoid the use of leaded ingredients without any significant sacrifice to the quality of the paint, and with very little, if any, increase in their total cost of production.

National Regulation

Development and implementation of a national relevant regulatory instrument to control lead in paint marketed in Cameroon is required to ensure the total phase out of lead paint in Cameroon.

National efforts should be encouraged to promote the establishment of appropriate national regulatory frameworks to control the manufacture, import, export, sale and use of lead paints and products coated with lead paints. In setting priorities and timeframes for implementation, special attention should be given to the elimination of solvent-based, enamel decorative paints and paints for other applications most likely to contribute to childhood lead exposure.

Public Awareness

Given the serious impact childhood lead poisoning has on both an individual and a nation's future, there is a need for public information campaigns about the hazards of lead paint. These campaigns should inform the public about the hazards of lead exposure, especially in children; the presence of lead in paints for sale and use on the national market; lead paint as a significant source of childhood lead exposure; and the availability of technically superior and safer alternatives.

CHAPTER ONE

BACKGROUND ON LEAD IN PAINT

Lead is a toxic metal that is found in some paints.

Paints contain lead when the paint manufacturer intentionally adds one or more lead compounds to the paint for some purpose. A paint product may also contain some amount of lead when paint ingredients contaminated with lead are used, or when there is cross-contamination from other product lines in the same factory.

The lead compounds most commonly added to paints are pigments. Pigments are used to give the paint its color, make the paint opaque (so it covers well), and protect the paint and the underlying surface from degradation caused by exposure to sunlight. Lead-based pigments are sometimes used alone, and sometimes used in combination with other pigments.

Lead compounds also may be added to enamel (oil-based) paints for use as driers (sometimes called drying agents or catalysts). Enamel paints dry to a hard and smooth surface through a process that involves chemical reactions in which paint ingredients called binders polymerize and crosslink. The driers serve as catalysts that speed up the process and make paints dry faster and more evenly. When lead compounds are used as driers, they are generally not used alone, but are usually combined with other driers, including compounds of manganese, cobalt, and others.

Lead compounds are also sometimes added to paints used on metal surfaces to inhibit rust or corrosion. The most common of these is lead tetroxide, sometimes called red lead or minium.

Inorganic pigments, fillers, and possibly some other ingredients used in the manufacture of paints may be derived from natural, earth-based materials, and may be more or less contaminated with lead depending on geological characteristics at the location where they were mined. When lead-contaminated ingredients are used in the manufacture of paints, this will contribute to the lead content of the paint.

Finally, when a paint manufacturer uses lead-containing compounds in the manufacture of some of its paints (such as industrial paints), other paints produced in the same facility might become contaminated with lead when proper housekeeping and cleanup procedures are not followed.

Non-leaded pigments, driers, and anti-corrosive agents have been widely available for decades, and are used by manufacturers producing the highest quality paints. In most cases, by avoiding the use of lead pigments, lead driers, and other intentionally added lead compounds, a paint manufacturer will produce paints with lead content well below 90 ppm that can be sold in any country in the world.

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints—the paints used on the interiors and exteriors of homes, schools, and other child-occupied facilities—beginning in the 1970s and 1980s. Many also imposed controls on the lead content of paints used on toys and for other applications likely to contribute to lead exposure in

Lead Paint Terminology

As used in this booklet:

- "Paint" includes varnishes, lacquers, stains, enamels, glazes, primers, or coatings used for any purpose. Paint is typically a mixture of resins, pigments, fillers, solvents, and other additives.
- "Lead paint" is paint to which one or more lead compounds have been added.
- "Lead pigments" are lead compounds used to give a paint product its color.
- "Lead anti-corrosive agents" are lead compounds used to protect a metal surface from rusting or other forms of corrosion.
- "Lead driers" are lead compounds used to make paint dry more quickly and evenly.
- "Decorative paint" refers to paints that are produced for use on inside or outside walls, and surfaces of homes, schools, commercial buildings, and similar structures. Decorative paints are frequently used on doors, gates, and windows, and to repaint household furniture such as cribs, playpens, tables, and chairs.
- "Solvent-based, enamel decorative paint" or "enamel decorative paint" refers to oil-based paints.
- "PPM" means parts per million total lead content by weight in a dried paint sample.

children. These regulatory actions were taken based on scientific and medical findings that lead paint is a major source of lead exposure in children, and that lead exposure in children causes serious harm, especially to children aged six years and under.

CHAPTER TWO

LEAD EXPOSURE AND ITS HEALTH EFFECTS

Children are not generally exposed to lead from paint while the paint is still in the can or when the paint is being newly applied to a previously unpainted or uncoated surface. Rather, lead exposure generally occurs after the lead paint has already dried on a painted wall or object.

Over time, paint on a surface will chip, wear, and deteriorate. This happens more quickly when the surface is exposed to sunlight or is subject to friction and impact (such as with windows and doors). Any lead present in the deteriorating paint is released to dust and soil in and around the home, school, or other location where the paint was used. When a surface previously painted with lead paint is sanded or scraped in preparation for repainting, very large amounts of lead-contaminated dusts are produced and spread.

Children playing indoors or outdoors get house dust or soil on their hands, and then ingest it through normal hand-to-mouth behavior. If the house dust or the soil is contaminated with lead, the children ingest lead. Hand-to-mouth behavior is especially prevalent in children aged six years and under, the age group

Lead Exposure Reduces Intelligence

Lead exposure in children may be measured in micrograms of lead per deciliter of blood (μg/dL) or in micrograms of lead per liter of blood (μg/L). At the low end of the lead exposure spectrum, an increase in blood lead level in a pre-school child from less than 1 μg/dL to 10 μg/dL is associated with a six point decrease in IQ (intellectual quotient) points. For children whose blood lead level is in the range of 10-20 μg/dL, a quarter to a half of an IQ point is lost for each 1 μg/dL increase in the blood lead.[1]

1 World Health Organization, Childhood Lead Poisoning, page 25, 2010

most easily harmed by exposure to lead. A typical one- to six-year-old child ingests between 100 and 400 milligrams of house dust and soil each day.[7]

In some cases, children pick up paint chips and put them directly into their mouths. This can be especially harmful because the lead content of chips can be much higher than what is typically found in dust and soils. When toys, household furniture, or other articles are painted with lead paint, children may chew on them and directly ingest the lead-contaminated, dried paint. Nonetheless, the most common way that children ingest lead is through lead-contaminated dust and soil that gets onto their hands.

While lead exposure is also harmful to adults, lead exposure harms children at much lower doses, and the health effects are generally irreversible and can have a lifelong impact.[8] The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate.[9] The human fetus is the most vulnerable, and a pregnant woman can transfer lead that has accumulated in her body to her developing child. Lead is also transferred through breast milk when lead is present in a nursing mother.

Once lead enters a child's body through ingestion, inhalation, or across the placenta, it has the potential to damage a number of biological systems and pathways. The primary target is the central nervous system and the brain, but lead can also affect the blood system, the kidneys, and the skeleton.

It is generally agreed that one key element in lead toxicity is its capacity to replace calcium in neurotransmitter systems, proteins, and bone structure, altering function and structure and thereby leading to severe health impacts. Lead is also known to affect and damage cell structure.[10]

Children are more sensitive to the harmful effects of lead than adults for several reasons, including:[11]

- A child's brain undergoes very rapid growth, development, and differentiation, and lead interferes with this process. For example, it has been shown that moderate lead exposure (5 to 40 μg/dL) during early childhood is connected to region-specific reductions in adult gray matter volume. Moderate blood levels have been linked to an increased likelihood of impaired

7 "The amount of soil and house dust that a typical 1–6-year-old child ingests is said to be 100 mg/24 h, but a more conservative estimate of 200 mg/24 h with an upper percentile of 400 mg/24 h has also been suggested." World Health Organization, Childhood Lead Poisoning, page 18. http://www.who.int/ceh/publications/leadguidance.pdf (2010)

8 Ibid, page 12

9 Ibid, page 48

10 Verstraeten, S.V., et al, Aluminium and lead: molecular mechanisms of brain toxicity, (Archives of Toxicology 82:789–802. DOI 10.1007/s00204-008-0345-3, 2008)

11 World Health Organization, Childhood Lead Poisoning, http://www.who.int/ceh/publications/leadguidance.pdf, 2010

cognition and executive function, impulsiveness, aggression, and delinquent behavior. The loss of gray matter in the brain constitutes a potential explanation for cognitive and behavioral problems associated with lead exposure.[12] Brain damage caused by chronic, low-level exposure to lead is irreversible and untreatable.

- Exposure to lead early in life can re-program genes, which can lead to altered gene expression and an associated increased risk of disease later in life. For example, gene alterations caused by prenatal lead exposure have been implicated in the development of Alzheimer's disease.[13]
- Gastrointestinal absorption of lead is enhanced in childhood. Up to 50 percent of ingested lead is absorbed by children, as compared with 10 percent in adults. (Pregnant women may also absorb more ingested lead than other adults.)[14]

According to WHO: "Lead has no essential role in the human body, and lead poisoning accounts for about 0.6% of the global burden of disease."[15] Evidence of reduced intelligence caused by childhood exposure to lead has led the World Health Organization (WHO) to list "lead-caused mental retardation" as a recognized disease. WHO also lists it as one of the top ten diseases whose health burden among children is due to modifiable environmental factors.[16]

In recent years, medical researchers have been documenting significant health impacts in children from lower and lower lead exposures.[17],[18] According to the World Health Organization: "There is no known safe level of exposure to lead."[19]

12 Cecil, K.M., et al., Decreased Brain Volume in Adults with Childhood Lead Exposure, (PLOS Medicine (2008) 5(5): e112. DOI:10.1371/journal.pmed.0050112)

13 Mazumdar, M., et al., Prenatal Lead Levels, Plasma Amyloid β Levels, and Gene Expression in Young Adulthood, (Environmental Health Perspectives (2012) 120 (5))

14 World Health Organization, Childhood Lead Poisoning, http://www.who.int/ceh/publications/leadguidance.pdf, 2010

15 World Health Organization, Childhood Lead Poisoning, 2010, page 11: http://www.who.int/ceh/publications/leadguidance.pdf

16 A. Prüss-Üstün and C. Corvalán, World Health Organization, Preventing Disease Through Healthy Environments: Towards an estimate of the environmental burden of disease, 2006, page 12: http://www.who.int/quantifying_ehimpacts/publications/preventingdisease.pdf

17 Herbert Needleman, Lead Poisoning,(Annual Review of Medicine 2004, http://www.rachel.org/files/document/Lead_Poisoning.pdf)

18 World Health Organization, Childhood Lead Poisoning, page 26 (citing the work of Lanphear et al., 2000): http://www.who.int/ceh/publications/leadguidance.pdf, 2010

19 World Health Organization, Frequently Asked Questions,International Lead Poisoning Awareness Campaign, Week of Action, 19-25 October, 2014, page 1: http://www.who.int/ipcs/lead_campaign/faq_lead_poisoning_prevention_campaign_en.pdf?ua=1

CHAPTER THREE

ECONOMIC IMPACTS OF LEAD PAINT EXPOSURE

When a young child is exposed to lead, the harm to her or his nervous system makes it more likely that the child will have difficulties in school and engage in impulsive and violent behavior.[20] Lead exposure in young children is also linked to increased rates of hyperactivity, inattentiveness, failure to graduate from high school, conduct disorder, juvenile delinquency, drug use, and incarceration.[21] Lead exposure impacts on children continue throughout life and have a long-term impact on a child's work performance, and—on average—are related to decreased economic success as measured by lifelong earnings.

A recent study investigating the economic impact of childhood lead exposure on national economies in all low- and middle income countries estimated a total cumulative cost burden of $977 billion international dollars[22] per year.[23] The study considered the neurodevelopmental effects on lead-exposed children, as measured by reduced IQ points, and it correlated lead exposure-related reductions in children's IQ scores to reductions in lifetime economic productivity, as expressed in lifelong earning power. The study identified many different sources of lead exposure in children, with lead paint as one major source. Broken down by region, the economic burden of childhood lead exposure as estimated by this study was:

- **Africa:** $134.7 billion of economic loss, or 4.03% of Gross Domestic Product (GDP)

20 Mielke, H.W. and Zahran, S., The urban rise and fall of air lead (Pb) and the latent surge and retreat of societal violence (Environment International. 43 (2012) 48-55)

21 World Health Organization, Childhood Lead Poisoning, page 28: http://www.who.int/ceh/publications/leadguidance.pdf, 2010

22 An International dollar is a currency unit used by economists and international organizations to compare the values of different currencies. It adjusts the value of the U.S. dollar to reflect currency exchange rates, purchasing power parity (PPP), and average commodity prices within each country. According to the World Bank, "An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States." The international dollar values in this report were calculated from a World Bank table that lists GDP per capita by country based on purchasing power parity and expressed in international dollars. The data from the table (at: http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD) was accessed by the report's authors in February 2012.

23 Teresa M. Attina and Leonardo Trasande, Economic Costs of Childhood Lead Exposure in Low- and Middle-Income Countries, (Environmental Health Perspectives; DOI:10.1289/ehp.1206424; http://ehp.niehs.nih.gov/1206424/)

- **Latin America and the Caribbean:** $142.3 billion of economic loss, or 2.04% of GDP
- **Asia:** $699.9 billion of economic loss, or 1.88% of GDP

CHAPTER FOUR

GLOBAL LEAD PAINT ELIMINATION EFFORTS

An international convention limiting the use of white lead was adopted by the General Conference of the International Labour Organization and ratified by 63 countries as early as 1921. Many highly industrial countries enacted laws, regulations, or mandatory standards to protect the health of their people in the 1970's and 1980's. These laws generally prohibit the manufacture, import, sale, or use of lead paint for interiors or exteriors of homes, schools, and other child-occupied facilities. The standard adopted by the United States imposes an upper limit of 90 ppm on total lead (dry weight) for decorative paints and many other paint categories. Other countries have adopted mandatory limits such as 90 or 600 ppm total lead (dry weight).

Analytical data from paint studies show that in countries where no national law, binding regulation, or other legal instrument specifically forbids it, some or most of the brands of enamel decorative paints for sale on the national market contain high levels of lead. This suggests that national laws, binding regulations, or other legal instruments are a key tool for controlling the lead content of paints.

At the second session of the International Conference on Chemicals Management (ICCM), held in 2009, several chemical issues were identified by consensus to be international priority issues of concern. One of these was lead in paints, and there was a decision to establish it as an international emerging policy issue.[24] In response to the ICCM decision, the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) jointly initiated a global partnership to eliminate the use of lead compounds in paints in order to protect public health and the environment. This partnership is called the Global Alliance to Eliminate Lead Paint (GAELP).[25] GAELP's broad objective is to phase out the manufacture and sale of paints containing lead, and eventually to eliminate the risks from such paints.[26]

24 http://www.saicm.org/images/saicm_documents/iccm/ICCM2/ICCM2%20Report/ICCM2%2015%20FINAL%20REPORT%20E.doc)

25 http://www.unep.org/hazardoussubstances/LeadCadmium/PrioritiesforAction/LeadPaints/tabid/6176/Default.aspx

26 http://www.unep.org/hazardoussubstances/LeadCadmium/PrioritiesforAction/GAELP/GAELPObjectives/tabid/6331/Default.aspx

In establishing a national legislative or regulatory framework to control the lead content of paints, the Global Alliance to Eliminate Lead Paint proposes the objectives should include the following:

- Prevention of the manufacture, import, use, and export of lead paint;
- Development of a system with effective means of enforcement and compliance;
- Establishment of institutional responsibilities and arrangements for management and enforcement of legislation and/or regulation.[27]

27 Ibid

CHAPTER FIVE

CAMEROON FRAMEWORK FOR ELIMINATING LEAD PAINT

In Cameroon, there is no regulation limiting the manufacture, import or use of paint with high lead content. Lead, in general, and lead in paint, in particular, is not addressed in the current national and regulatory framework in Cameroon. Nor is there currently an appropriate enabling framework law from which a regulatory measure to control lead paint can be derived.

CREPD has been instrumental in advocating for lead paint control in Cameroon since 2011 and is fortunate to have worked with key government ministries, industry, consumer associations and the national agency involved in activities related to lead paint regulation in Cameroon. Within the framework of national SAICM implementation, national stakeholders have recognized CREPD as a leading NGO in the fight for lead paint elimination in Cameroon.

Lead content in paints in Cameroon can be controlled by a mandatory standard set by the National Standard and Quality Agency (ANOR). CREPD and ANOR have worked together to set a lead paint standard of 90 ppm.

But the Standard development process (3 months - 1 year) is generally funded by the applicant (industry and others). In this case, CREPD was invited to help ANOR to raise funds for the process to complete its work, but CREPD does not have the funds to support this activity.

Another option to control lead paint is through legislation. In Cameroon (as in many other countries), environmental legislation requires two parts: (1) 'framework' legislation, which reflects in national law relevant international conventions; and (2) detailed regulations such as laws, directives, regulations, decisions, statutes, or executive orders related to the specific issue, for example, limiting the lead level in paint and/or other exposure sources; setting a certification standard, etc.

The Ministry of Environment already has a framework law, which, even though it is not comprehensive, can accommodate a subsidiary regulation on lead paint. But to date, this Ministry has not been willing to act as lead ministry for the adoption of a regulation to control lead in paint. Unfortunately,

the sector framework law of the Ministry of Health is not appropriate for lead paint regulation.

Regardless of the lead ministry, the legislative process also must go through the interministerial process in the Prime Minister's Office where all the relevant sector ministries sit together to examine the draft regulation.

CREPD has been working to develop a specific framework law that is suitable for both the Health and Environment ministries and that clearly indicates the subsidiary regulations. This subsidiary regulation could include:

- A regulation limiting the lead level in paints (and other exposure sources for children); and/or
- A certification standard.

CHAPTER SIX

LEAD PAINT MARKET CAMEROON

There is no national statistical data on the paint industry and market share in Cameroon. However, some rough estimate can be inferred based on CREPD's previous and present market surveys.

CREPD's 2011 paint survey indicated that 45% of the paints distributed in Yaoundé, Cameroon are oil-based paints or enamel decorative paints, while 38% are latex, and 17% are other (synthetic). The countries/regions of origin of the paints identified in 2011 are as follows:

- Cameroon 39%
- UAE, Asian and Oceania countries 29%
- EU 14%
- North Africa 10%
- Other European countries 5%
- China 2%
- Nigeria 0.5%
- North America 0.5%
- Latin America 0.5%

The country/region of origin distribution above suggests that paints marketed in Cameroon come from all the continents.

The companies with the largest market share are (in order of decreasing importance of market share):

- CEP/Seigneurie (local representation of PPG multinational) with about 50-60% of market share
- Smalto (local manufacturer previously of Italian investment) with about 20%
- National paint (imported from UAE) with about 15% of market share

- Socipec (local manufacturer) with about 15% of market share.[28]

All other local and foreign brand make up the remaining 15% of paint market share. The major local paint manufacturers and brand holders are located in Douala, the industrial capital of Cameroon.

CREPD's 2015 market survey covered more than 40 paint retailer outlets and wholesalers distributing solvent-based, enamel decorative and other architectural paints in Yaoundé, Cameroon and is consistent with the 2011 paint market survey. The 2015 paint market survey results show that paint products from the following manufacturers are no longer available in the market at the representative paint retailer outlets visited: Ever paint industry (UAE); Indus-Chimie (Côte d'ivoire); Industria (Côte d'Ivoire); IMSA (Cameroon); OASIS (Cameroun); Citizen Chemical Industry (Nigeria); ONIP (France)

This study also helped to identify new, local paint manufacturers and brand holders in Cameroon compared to 2011 results. They are INODA, which manufactures and distributes the UNIVERSAL and Rossignol oil-based paint brand; EUROTEX distributing paint products made in Spain; BENGEL (Europe); Continental (Algeria) and Benchon; Ecopaint (Cameroon); SODIP (Cameroon); RITVER (Lebanon); Prodec (Morocco); Nespoli (Italy); BASF SA. Sunvinil (Brazil); and Pelican (Cameroon).

Paint manufacturers and brand holders that are constant on the market since 2011 as indicated by this survey are CEP/Seigneurie (Cameroon), Smalto (Cameroon), National paint (UAE), SOCIPEC, International trust (CE), Soquicam (Cameroon), Simpex, CIAC (Cameroon), Littocol (Cameroon).

More advocacy and pedagogic work is needed to develop reliable figures on annual sales in the country as well as the percentage of growth of the paint industry, per capita consumption, and per capita consumption compared to other parts of Africa. There is no national statistical data on paint producers and most paint producers consider their market data to be confidential.

28 Qualitative information derived from a comprehensive paint market survey undertook in 2011 by CREPD within the SAICM QSP lead elimination project in Cameroon.

CHAPTER SEVEN

MATERIALS AND METHODS

From February to March CREPD purchased 54 cans of solvent-based, enamel decorative, anticorrosive and automotive paints from various stores in Yaoundé and Douala. These paints were produced by 20 different local and foreign manufacturers. In most cases, CREPD selected one yellow paint and another colored paint such as green, red, red brown, brown red, red oxide, brownish, blue, white and black. The availability of these paints in retail establishments suggested that they were intended to be used within home environments. Excluded were automotive and industrial paints that are not typically used for domestic housing applications or for painting toys.

During the sampling, information such as color, brand, country/economic integration (i.e., European Union) where manufactured, purchase details, date manufactured as provided on the label of the paint can was recorded. The formats used for date of manufacturer varied with some companies providing day, month and year and others providing week, month and year. Some companies provide only the shelf end life date of their products. Almost all the paint companies used both a single word to describe some colors, such as "red," while others use double word such as "bright red." Colors were recorded as provided on the can. For the red and yellow paints the protocol called for obtaining "bright" or "strong" red and yellow paints when available. Dates of purchase were recorded in the day/ month/year format in most cases. For simplification purposes, the paint with red brown, brown red, brown and red oxide colors will be grouped as brownish colored paints, while paints with black and grey colors will be grouped as dark colored paints.

All paints were purchased from paint stores in local markets and communities, hardware stores, building supply stores and larger retail establishments used by the general public. In other words, paints were selected that were presumed to be intended for home and architectural use. Automotive and industrial paints are sold without restriction to consumers. These paints are commonly used to repaint cars and/or for other domestic housing applications (windows, doors, fences and suitcases etc. in metal). Open air car repaint workshops are commonly found close to schools and residential areas and are source of paint dust to the surroundings.

Paint sampling preparation kits containing individually numbered, untreated wood pieces, single-use paintbrushes and stirring utensils made from untreated

wood sticks were assembled and shipped to CREPD by the staff of the IPEN partner NGO, Arnika, in the Czech Republic.

Each can of paint was thoroughly stirred and was subsequently applied onto individually numbered triplicates of untreated wood pieces using different unused single-use paintbrushes by the staff of CREPD as shown in Figure 1.

Each stirring utensil and paint brush was used only once, and extra caution was taken to avoid cross contamination. All samples were then allowed to dry at room temperature for five to six days. After drying, the painted wood pieces were placed in individual resealable plastic bags and shipped to Forensic Analytical Laboratories, Inc. in the United States. Paint samples were analyzed using method EPA 3050B/7420 (atomic absorption), a method recognized as suitable by WHO.[29]

Figure 1: Paint sampling by CREPD's staff

29 WHO (2011). Brief guide to analytical methods for measuring lead in paint. http://www.who.int/ipcs/assessment/public_health/lead_paint.pdf

CHAPTER EIGHT

RESULTS

A total of 54 cans of solvent-based, enamel decorative, anticorrosive and automotive paints were purchased in Yaoundé and Douala in Cameroon and analyzed for their lead content. Results are given in parts per million (ppm) lead, dry weight. The results can be disaggregated as follows:

More than half of the decorative paints analyzed would not meet the regulatory standard established in most industrialized countries. Samples from 19 of the 35 enamel decorative paints (54%) had lead content above 90 ppm, and 18 paints out of those 19 (51%) had lead content above 600, and 8 paints (23%) had a lead content greater than 10,000 ppm.

Regarding the anticorrosive paints, 3 out of the 12 anticorrosive paints (8 from local manufacturers) had a lead content greater than 90 ppm, representing 25% of the anticorrosive paints. The lead content ranged between below 60 - 2,100 ppm and the highest lead concentration was recorded in an imported anticorrosive paint (CMR-122).

For automotive paints, samples from 5 of 7 paints (71%) had a lead content above 600 ppm, and 3 out of these 5 paints contained more than 10,000 ppm lead. Lead levels in automotive paints ranged from below 60 to 85,000 ppm.

A previous study by Gottesfeld et al. 2013 found that samples from 66% of the enamel decorative paints (28 paints) from Cameroon shops contained more than 90 ppm lead, of which 98% (27 paints) contained more than 600 ppm lead. Therefore, the results in this current study demonstrate a slight positive improvement. This is largely due to the voluntary action of local major paint manufacturers to reformulate their products as a result of previous interventions on lead paint elimination issues in Cameroon. The difference is more striking when the results are analyzed to compare local versus imported paint.

Lead Concentrations by Brand

Locally produced paints are more likely to meet international standards than imported paints. A total of 29 enamel paints from local manufacturers were analyzed (54% of all paints).

From the data in Table 1, it can be seen that 5 out of the 8 local manufacturers are currently producing one or more decorative, automotive or anticorrosive paint with less than 90 ppm lead (19 out of 29 locally produced paints). These

TABLE 1 : PERCENTAGE OF PAINT WITH LEAD CONTENT ABOVE AND BELOW 90 PPM BY BRAND OF LOCALLY MANUFACTURED PAINTS.

Brand/ Manufacturer	Total Samples/ Group	Percentage of Paints with More than 90 ppm Lead (Number)	Percentage of Paint with Less than 90 ppm Lead (Number)	Maximum Lead Content (Corresponding Color)
CEP/Seigneurie	7 (total)	14% (1)	86% (6)	45,000 ppm (yellow Duco)
	3 (decorative)	0% (0)	100% (3)	< 60 ppm
	1 (anticorrosive)	0% (0)	100% (1)	< 60 ppm
	3 (automotive)	33% (1)	67% (2)	45,000 ppm (Yellow Duco)
INODA	6 (total)	(0%) (0)	100% (6)	80 ppm
	4 (decorative)	0% (0)	100% (4)	< 60 ppm
	2 (anticorrosive)	0% (0)	100% (2)	80 ppm
SMALTO	9 (total)	56% (5)	44% (4)	70,000 ppm (Green)
	8 (decorative)	63% (5)	47% (3)	70,000 ppm (Green)
	1 (anticorrosive)	0% (0)	100% (1)	< 60 ppm
SOCIPEC	1 (anticorrosive)	0% (0)	100% (1)	<60 ppm
LITTOCOL	2 (anticorrosive)	0% (0)	100% (2)	< 60 ppm
SOQUICAM	1 (anticorrosive)	100% (1)	0% (0)	540 ppm (Red Brown)
PELICAN	2 (decorative)	100% (2)	0% (0)	4,800 ppm (Red)
Ferox	1 (anticorrosive)	100% (1)	0% (0)	710 ppm (Red Brown)

manufacturers are CEP/Seigneurie (initiated its reformulation process a few years back); Smalto, LITTOCAL , and SOCIPEC (which have just started to reformulate their products to produce paints without using leaded ingredients); and INODA (a new major player with installations in Douala, operational since 2015, producing paints without using leaded ingredients). The smaller size enterprises and brand holders, like SOQUICAM, PELICAN and Ferox, produce only paints above 90 ppm lead. Thirty-four percent of the locally-made paints (10 of 29 paints) analyzed in this study had a lead content above 90 ppm.

Table 2 shows results from 25 imported paints (representing 12 manufactures/ brands) analyzed in this study. Samples from 17 of the 25 imported paints contained lead above 90 ppm (68% of imported paints), representing 6 out of the 12 foreign brands market paints. Samples from 16 paints contained more than 600 ppm lead, and 8 paints contained more than 10,000 ppm lead. The highest lead content of 85,000 ppm was recorded on a paint sample imported from Morocco. Paint samples labeled "exported quality" manufactured by Simpex in the EU/EC were all found to have lead content ranging between 2,300-27,000 ppm.

Also worth noting is that two of the brands of imported paint with high levels of lead make the claim that they are approved for use within the European Union (EU) or to have been produced within the EU. International Trust paint cans have the CE mark used by manufacturers to declare that the product meets European Commission requirements. However, this product would not be allowed for sale within the EU. Paint cans from Simpex say "Produced in EEC" and "Produced in EU" and are labelled "Export Quality." The paint in all of these cans contained lead at levels that would not be allowed for sale in the European Union.

Figure 2: Photo of the "Export Quality" Enamel paint produced in the EU.

TABLE 2: PERCENTAGE OF PAINT WITH LEAD CONTENT ABOVE AND BELOW 90 PPM BY BRAND OF IMPORTED PAINTS.

Brand Name/ Country of Manufacture	Total Samples (Group)	Percentage of Paints Containing More than 90 ppm Lead (Number)	Percentage of Paint Containing 90 ppm Lead or Less (Number)	Maximum Lead Content (in Color)
National Paint/ UAE	3 (decorative)	67% (2)	33% (1)	18,000 ppm (Green)
Continental/ Algeria	3 (total)	100% (3)	0% (0)	6,900 ppm (Red)
	2 (decorative)	100% (2)	0% (0)	6,900 ppm (Red)
	1 (anticorrosive)	100% (1)	0% (0)	2,100 ppm (Red)
Prodec/Morocco	3 (automotive)	100% (3)	0% (0)	85,000 ppm (Yellow)
Colorado/ Morocco	1 (automotive)	100% (1)	0% (0)	640 ppm (Blue)
Simpex /EU, EEC	4 (decorative)	100% (4)	0% (0)	27 000 ppm (Green)
BASF SA/Brazil	1 (decorative)	0% (0)	100% (1)	< 60 ppm
Ritver/U.A.E	2 (decorative)	100% (2)	0% (0)	60,000 ppm (Yellow)
Capcolor/Tunisia	2 (decorative)	50% (1)	50% (1)	5,900 ppm (Green)
International Trust/Lebanon	1 (decorative)	100% (1)	0% (0)	2,600 ppm (Red)
Force One/ France	1 (anticorrosive)	0% (0)	100% (1)	90 ppm (Red)
Xylazel/Spain	1 (decorative)	0% (0)	100% (1)	< 60 ppm
Nespoli/Italy	3 (decorative)	0% (0)	100% (3)	< 60 ppm

Lead Concentrations by Color

Bright colors (e.g. yellow, green, red) had the highest lead content. A total of 10 different colors of paint were analyzed for lead content, including 11 red,

9 blue, 8 yellow, 8 green, 9 brownish (including the brown red, red brown, brown, and red oxide), 3 white, and 6 dark colored paints such as black and grey. Twenty-seven paints representing 7 different colors were found to contain more than 90 ppm lead. Among these paints, yellow and green paint, irrespective of whether they were decorative, anticorrosive or automotive paint, had the highest average lead concentrations of 65,000 ppm and 27,400 ppm, respectively. Details including the group characteristics (decorative, anticorrosive and automotive) are shown in Table 3.

TABLE 3: LEAD CONTENT IN PAINTS BY COLOR.

Color	Number of Samples	Minimum Lead Content (ppm)/ Group	Maximum Lead Content (ppm)/ Group	Average Lead Content (ppm)
Black	1	< 60 (decorative)	-	<60
	2	< 60 (automotive)	< 60 (automotive)	
Blue	8	< 60 (decorative)	2,800 (decorative)	829
	2	< 60 (automotive)	640 (automotive)	
Brownish	2	< 60 (decorative)	10,000 (decorative)	1,290
	7	< 60 (anticorrosive)	710 (anticorrosive)	
Green	6	< 60 (decorative)	56,000 (decorative)	16,300
	2	< 60 (automotive)	15,000 (automotive)	
Grey	1	2,300 (decorative)	-	-
Red	8	< 60 (decorative)	11,000 (decorative)	3,960
	3	< 60 (anticorrosive)	2,100 (anticorrosive)	
	1	9,800 (automotive)	-	
White	3	< 60 (decorative)	6,200 (decorative)	2,110
Yellow	6	< 60 (decorative)	70,000 (decorative)	32,500
	2	45,000 (automotive)	85,000 (automotive)	

The highest content of lead (85,000 ppm) was recorded in a yellow paint imported from Morocco. The highest lead content in locally manufactured paint was 70,000 ppm in a yellow colored paint manufactured by Smalto. High lead content was also recorded in paints with the following colors: green (up to 56,000 ppm), red (up to 11,000 ppm, brownish (up to 10,000 ppm), white (6,200 ppm), and blue (up to 2,800 ppm) color paints (Table iii).

Paint colors with only one sample in the 28 paints with more than 90 ppm lead, included a white color paint and a grey color paint, with lead contents of 6,200 ppm and 2,300 ppm, respectively.

Consumer Information

Paint labels for only one company – CEP/Seigneurie – include accurate information about lead content. The CEP/Seigneurie label clearly indicates that the paint product bearing it contains less than 90 ppm lead. However, one sample labeled as containing less than 90 ppm lead by CEP/Seigneurie was found to have 45, 000 ppm lead. CEP/Seigneurie's product labeling is the result of voluntary reform and is good progress toward consumer "Right to Know". Two other brands, Continental, an imported brand by SARL Devco Co. Algeria, and International Trust, manufactured in Lebanon and which carries the CE mark, indicating that it meets the standard of the European Union, also included information indicating "lead-free" or "exempted of lead" on their cans. Unfortunately, the cans carrying these labels contained paints with 2,100 and 2,600 ppm lead respectively.

Most importantly, 83% of paint pots of this study have no labeling with regard to lead. This result indicates that people will continue to be exposed to lead poisoning from many paints as long as an informative paint labeling with special emphasis on lead content is not put in place for all paints sold in Cameroon and people are educated on the hazards of lead paint

CHAPTER NINE

CONCLUSIONS AND RECOMMENDATIONS

This study showed that 27 samples representing 50% of the total paints analyzed contained lead at levels above 90 parts per million (ppm, based on dry weight of the paint), and 25 samples had a lead content above 600 ppm. Nine paints contained lead at dangerously high levels above 10,000 ppm. Consequently, more than half of the total paints marketed in Cameroon would not meet the regulatory standard of maximum 90 ppm lead content established in the United States and would not be permitted for sale in most industrialized countries. Locally produced paints are more likely to meet this international standard than imported paints.

Regulatory Framework

Industry, government and civil society should engage in national efforts to promote the establishment of appropriate national regulatory frameworks to control the manufacture, import, export, sale, and use of lead paints and products coated with lead paints. In setting priorities and timeframes for implementation, special attention should be given to the elimination of lead in enamel decorative paints and paints for other applications most likely to contribute to childhood lead exposure. The regulatory framework should establish an appropriate lead paint standard, such as 90 ppm, and consideration should be given to the inclusion of provisions for compliance, monitoring, and enforcement.

Public Awareness

Given the serious impact childhood lead poisoning has on both an individual's and the nation's future, there is a need for public information campaigns in Cameroon and other countries where results show the presence of lead paint on the market. These campaigns should inform the public about the hazards of lead exposure, especially in children; the presence of lead decorative paints for sale and use on the national market; lead paint as a significant source of childhood lead exposure; and the availability of technically superior and safer alternatives. There is also a need to raise awareness of the need to take special precautions when preparing a previously painted surface for repainting; the need for training in lead-safe work practices for painters and others

working on previously-painted surfaces; and the need for resources to conduct such training.

Government agencies, NGOs and other organizations of civil society, as well as health professionals and others, are encouraged to carry out awareness-raising in the above-mentioned areas. Stakeholders are encouraged to foster voluntary initiatives by paint manufacturers, importers, and vendors to phase out the use of lead compounds in their products, even before any national legal instrument is adopted or enters into force.

Voluntary Action and Labeling

In Cameroon, two paint manufacturers (CEP/Seigneurie and Smalto) have voluntarily pledged to eliminate lead compounds in the formulation of their paints. Paint manufacturers in countries that lack a well-enforced national lead paint control regime, such as Cameroon, should be encouraged to act voluntarily to eliminate lead compounds in the formulation of their paints – particularly, their enamel decorative paints and paints for other applications likely to contribute to lead exposure in children and others. This can be done before and after the national lead control legal instruments are in place. Voluntary action is important in reinforcing the enforcement of the legal instruments especially in countries where enforcement is poor.

Paint manufacturers are also encouraged to consider voluntary participation in programs that provide third-party certification of no added lead, and product labeling to enable consumers to identify paints that do not contain added lead. In addition, paint manufacturers could provide information on paint can labels warning of the serious risk that may arise from lead dust when preparing a previously painted surface for repainting.

APPENDIX A

TABLE 1. SOLVENT-BASED, ENAMEL DECORATIVE PAINTS PURCHASED AND ANALYZED FOR LEAD CONTENT IN CAMEROON

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (USD)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
CMR-100	CEP/ Seigneurie	Yellow	100g	1,82			16-Feb-2015	
CMR-101	CEP/ Seigneurie	Green	100g	1,85			24-Feb-2015	
CMR-102	CEP/ Seigneurie	Blue	100g	1,85			24-Feb-2015	
CMR-103*	CEP/ Seigneurie	Brown red	1kg	6,5	2614	00159	23-Feb-2015	
CMR-104**	CEP/ Seigneurie	Yellow	1kg	14,5	3412	01264	24-Feb-2015	
CMR-105**	CEP/ Seigneurie	Green	1kg	14,5	Exists but tiered	Exists but tiered	24-Feb-2015	
CMR-106**	CEP/ Seigneurie	Blue	1kg	14	5114	01204	23-Feb-2015	
CMR-107	Smalto	Yellow	100g	2			16-Feb-2015	
CMR-108	Smalto	Green	100g	2			23-Feb-2015	
CMR-109	Smalto	Blue	100g	1,7			24-Feb-2015	
CMR-110	Smalto	Red	100g	2		10010053	23-Feb-2015	

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (USD)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
CMR-111*	Smalto	Red brown	1kg	5		14090488	23-Feb-2015	
CMR-112	Smalto	Brown	100g	2			24-Feb-2015	
CMR-113	Smalto	Blue	1kg	5,55			04-Mar-2015	
CMR-114	Smalto	Blue	1kg	3,95		07020122	04-Mar-2015	
CMR-115	Smalto	Green	1kg	4,45		Exists but cannot read	04-Mar-2015	
CMR-116	National paint	Green	1kg	6,6			16-Feb-2015	www.national-paints.com
CMR-117	National paint	Red	1kg	5,6			23-Feb-2015	www.national
CMR-118	National paint	Blue	1kg	6,6			23-Feb-2015	www.national
CMR-119*	Universal (INODA)	Red oxide	1kg	5	End of Shelf-life 14-Apr-2015	1404115-C-01	23-Feb-2015	
CMR-120*	Universal (INODA)	Black	1kg	5	End of Shelf-life 16-Jun-2015	140617-C-01	23-Feb-2015	
CMR-121	Universal (INODA)	White	1kg	6	End of Shelf-life 16-Nov-2015	141117-C-07	03-Mar-2015	
CMR-122*	Continental	Red	1kg	5		M030286BE	16-Feb-2015	

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (USD)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
CMR-123	Conti-nental	Red	1kg	5		J020076B	23-Feb-2015	
CMR-124	Conti-nental	White	1kg	5		V020083BE	03-Mar-2015	
CMR-125	Ros-signol (INODA)	Red	1kg	11	End of Shelf-life 21-Feb-2015	140222-C-03	23-Feb-2015	
CMR-126	Ros-signol (INODA)	White	1kg	10	End of Shelf-life 12-Feb-2015	140213-C-02	03-Mar-2015	
CMR-127	Ros-signol (INODA)	Black	1kg	10	End of Shelf-life 14-Feb-2015	140215-C-01	03-Mar-2015	
CMR-128*	SOCI-PEC	Red brown	1kg	5,6			23-Feb-2015	
CMR-129**	Prodec	Yellow	85g	1,3			24-Feb-2015	www.prodec.ma
CMR-130**	Colo-rado	Blue	85g	1,3			24-Feb-2015	www.prodec.ma
CMR-131**	Prodec	Green	85g	1,3			24-Feb-2015	www.prodec.ma
CMR-132**	Prodec	Red	85g	1,3			23-Feb-2015	www.prodec.ma

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (USD)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
CMR-133*	Cam-ero-peint/ SOQUI-CAM	Red brown	1kg	3,7			16-Feb-2015	
CMR-134	Simpex	Blue	1kg	4,8			24-Feb-2015	
CMR-135	Simpex	Green	1kg	4,8			24-Feb-2015	
CMR-136	Simpex	Red	1kg	4,8			24-Feb-2015	
CMR-137	Simpex	Grey	1kg	4,8			24-Feb-2015	
CMR-138*	Littocol	Brown	1kg	5			03-Mar-2015	
CMR-139*	Littocol	Black	1kg	5			03-Mar-2015	
CMR-140*	Ferox	Brown red	1kg	5			03-Mar-2015	
CMR-141	BASF SA. Sunvinil	yellow	1kg	6			03-Mar-2015	www.sunvinil.com.br
CMR-142	RITVER	Yellow	1kg	5		PS3005-230	03-Mar-2015	
CMR-143	RITVER	Brown	1kg	5		PS3001-752	03-Mar-2015	
CMR-144	Cap-color	Green	1kg	3,3	09-Oct-2012	X1228005	03-Mar-2015	www.pein-tures
CMR-145	Cap-color	Yellow	1kg	3,3	29-Sep-2012	X1227405	03-Mar-2015	www.pein-tures

Sample Number	Brand Name	Color of Paint	Paint Can Size	Purchase Price Per Litre (USD)	Date Manufactured	Batch Number	Date of Purchase	Website on Label
CMR-146	Interna-tional trust	Red brown	1kg	5			04-Mar-2015	
CMR-147	Pelican	Red	100 g	1,8			04-Mar-2015	
CMR-148	Pelican	Blue	100g	1,8			04-Mar-2015	
CMR-149*	Force one	Red	1kg	5	06-May-2013		04-Mar-2015	
CMR-150*	Xylazel	Red	750 ml	18		XZ13400201	04-Mar-2015	www.xylazel.com
CMR-151	Nespoli	Red	400 ml	8,428		180010	11-Mar-2015	
CMR-152	Nespoli	Yellow	400 ml	8,428		180013	11-Mar-2015	
CMR-153	Nespoli	Blue	400 ml	7,882		180019	11-Mar-2015	

* *Anticorrosive paint samples*

** *Automotive paint samples*

TABLE 2: RESULTS OF LEAD ANALYSIS FOR SOLVENT-BASED ENAMEL DECORATIVE PAINTS PURCHASED IN CAMEROON

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Is there information on can about lead content of paint?
CMR-100	CEP/Seigneurie	Yellow	< 60	USA	Cameroon	Yes Lead concentration less than 90 ppm
CMR-101	CEP/Seigneurie	Green	< 60	USA	Cameroon	Yes Lead concentration less than 90 ppm
CMR-102	CEP/Seigneurie	Blue	< 60	USA	Cameroon	Yes Lead concentration less than 90 ppm
CMR-103*	CEP/Seigneurie	Brown red	< 60	USA	Cameroon	Yes Lead concentration less than 90 ppm
CMR-104**	CEP/Seigneurie	Yellow	45000	USA	Cameroon	Yes Lead concentration less than 90 ppm
CMR-105**	CEP/Seigneurie	Green	< 60	USA	Cameroon	Yes Lead concentration less than 90 ppm
CMR-106**	CEP/Seigneurie	Blue	< 60	USA	Cameroon	Yes Lead concentration less than 90 ppm
CMR-107	Smalto	Yellow	70000	Cameroon	Cameroon	No
CMR-108	Smalto	Green	8500	Cameroon	Cameroon	No
CMR-109	Smalto	Blue	< 60	Cameroon	Cameroon	No

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Is there information on can about lead content of paint?
CMR-110	Smalto	Red	< 60	Cameroon	Cameroon	No
CMR-111*	Smalto	Red brown	< 60	Cameroon	Cameroon	No
CMR-112	Smalto	Brown	< 60	Cameroon	Cameroon	No
CMR-113	Smalto	Blue	2700	Cameroon	Cameroon	No
CMR-114	Smalto	Blue	350	Cameroon	Cameroon	No
CMR-115	Smalto	Green	56000	Cameroon	Cameroon	No
CMR-116	National paint	Green	18000	UAE	UAE	No
CMR-117	National paint	Red	11000	UAE	UAE	No
CMR-118	National paint	Blue	< 60	UAE	UAE	No
CMR-119*	Universal (INODA)	Red oxide	< 80		Cameroon	No
CMR- 120*	Universal (INODA)	Black	<60		Cameroon	No
CMR-121	Universal (INODA)	White	< 60		Cameroon	No
CMR-122*	Continental	Red	2100		Imported by SARL Devco Co. Algeria	Yes Exempted from lead
CMR-123	Continental	Red	6900		Imported by SARL Devco Co. Algeria	No
CMR-124	Continental	White	6200		Imported by SARL Devco Co. Algeria	No
CMR-125	Rossignol (INODA)	Red	< 60		Cameroon	No
CMR-126	Rossignol (INODA)	White	< 60		Cameroon	No

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Is there information on can about lead content of paint?
CMR-127	Rossignol (INODA)	Black	< 60		Cameroon	No
CMR-128*	SOCIPEC	Red brown	< 60		Cameroon	No
CMR-129**	Prodec	Yellow	85000		Morocco	No
CMR-130**	Colorado	Blue	640		Morocco	No
CMR-131**	Prodec	Green	15000		Morocco	No
CMR-132**	Prodec	Red	9800		Morocco	No
CMR-133*	Camero-peint/ SOQUICAM	Red brown	540	Cameroon	Cameroon	No
CMR-134	Simpex	Blue	1500	EU	EU	No
CMR-135	Simpex	Green	27000	EU	EU	No
CMR-136	Simpex	Red	10000	EU	EU	No
CMR-137	Simpex	Grey	2300	EEC	EEC	No
CMR-138*	Littocol	Brown	< 60	Cameroon	Cameroon	No
CMR-139*	Littocol	Black	< 60	Cameroon	Cameroon	No
CMR-140*	Ferox	Brown red	710		Cameroon	No
CMR-141	BASF SA. Sunvinil	yellow	< 60	Brazil	Brasilia	No
CMR-142	RITVER	Yellow	60000	Italy	UAE	No
CMR-143	RITVER	Brown	10000	Italy	UAE	No
CMR-144	Capcolor	Green	5900		Tunisia	No
CMR-145	Capcolor	Yellow	80		Tunisia	No
CMR-146	International trust	Red	2600		CE	Yes Lead Free paint
CMR-147	Pelican	Red	4800	Cameroon	Cameroon	No
CMR-148	Pelican	Blue	2800	Cameroon	Cameroon	No

Sample Number	Brand Name	Color of Paint	Lead Content of Paint (ppm)	Country of Brand Headquarters	Country Where Manufactured	Is there information on can about lead content of paint?
CMR-149*	Force one	Red	90	France	France	No
CMR-150*	Xylazel	Red	< 60		Spain	No
CMR-151	Nespoli	Red	< 60		Italy	No
CMR-152	Nespoli	Yellow	< 60		Italy	No
CMR-153	Nespoli	Blue	< 60		Italy	No

* *Anticorrosive paint samples*

** *Automotive paint samples*

TABLE 3. DISTRIBUTION OF LEAD CONCENTRATION BY BRAND OF SOLVENT-BASED, ENAMEL DECORATIVE PAINTS PURCHASED IN CAMEROON

Brand	Number of Paints	Average Lead Concentration (ppm)	Number of Paints >90 ppm Lead	Number of Paints >600 ppm Lead	Number of Paints >10,000 ppm Lead	Minimum Lead Concentration (ppm)	Maximum Lead Concentration (ppm)
CEP/Seigneurie	3 (decorative)	<60 ppm	0	0	0		<60 ppm
CEP/Seigneurie	1 (anticorrosive)	<60 ppm	0	0	0		<60 ppm
CEP/Seigneurie	3 (automotive)	45,000	1	1	1		45,000
Smalto	8 (decorative)	27,510	5	4	2	350	70,000
Smalto	1 (anticorrosive)	<60 ppm	0	0	0		<60 ppm
INODA	4 (decorative)	<60 ppm	0	0	0		<60 ppm
INODA	2 (anticorrosive)	<60 ppm	0	0	0		<60 ppm
National paint	3 (decorative)	14,500	2	2	2	11,000	18,000
Continental	2 (decorative)	6,550	2	2	0	6,200	6,900
Continental	1(anticorrosive)	2,100	1	1	0		2,100
Colorado	4 (automotive)	27,610	4	4	2	640	85,000
Camero-peint/ SOQUICAM	1 (anticorrosive)	540	1	0	0		540
Simpex	4 (decorative)	10,200	4	4	1	1,500	27,000
Ferox	1 (anticorrosive)	710	1	1	0		710
RITVER	2 (decorative)	35,000	2	2	1	10,000	60,000
Capcolor	2 (decorative)	5,900	1	1	0		5,900
International trust	1 (decorative)	2,600	1	1	0		2,600
Pelican	2 (decorative)	3,800	2	2	0	2,800	4,800
Force one	1 (anticorrosive)	90	0	0	0		90

LITTOCOL	2 (anticorrosive)	<60 ppm	0	0	0	< 60 ppm
BASF SA. Sun-vinil	1 (decorative)	<60 ppm	0	0	0	<60 ppm
Xylazel	1 (anticorrosive)	<60 ppm	0	0	0	<60 ppm
Nespoli	3 (decorative)	<60 ppm	0	0	0	<60 ppm

TABLE 4. LEAD CONCENTRATION BY COLOR OF SOLVENT-BASED, ENAMEL DECORATIVE PAINTS PURCHASED IN CAMEROON

Color	Number of Samples	Average Lead Concentration (ppm)	Number of Samples >90 ppm Lead	Number of Samples >600 ppm Lead	Number of Samples >10,000 ppm Lead	Minimum Lead Concentration (ppm)	Maximum Lead Concentration (ppm)
Yellow	3 (decorative)	43,400	2	2	2	80	70,000
	2 (automotive)	65,000	2	2	2	45,000	85,000
Green	8 (decorative)	21,700	6	6	4	5,900	56,000
Blue	8 (decorative)	1,837	4	3	0	350	2,800
	2 (automotive)	640	1	1	0		640
Red	7 (decorative)	8,200	4	4	1	4,800	11,000
	3 (anticorrosive)	1,100	2	1	0	90	2,100
	1 (automotive)	9,800	1	1	0		9,800
Brown*	3 (decorative)	3,600	2	2	1	2,600	10,000
	6 (anticorrosive)	443	2	1	0	80	710
White	3 (decorative)	6,200	1	1	0		6,200
Grey	1 (decorative)	2,300	1	1	0		2,300

* Includes brownish colors, e.g., red brown, brown red, or red oxide.

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