JAMAICA

LEAD IN SOLVENT-BASED PAINTS FOR HOUSEHOLD USE IN JAMAICA

October 2018

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NATIONAL REPORT

LEAD IN SOLVENT-BASED PAINTS FOR HOUSEHOLD USE IN JAMAICA

October 2018

ACKNOWLEDGMENTS

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While this study was undertaken with funding assistance from the New York Community Trust and the Swedish Government, responsibility for the content lies entirely with IPEN and CARPIN. The New York Community Trust and the Swedish Government do not necessarily share the expressed views and interpretations.

Established in 1998, IPEN is currently comprised of over 500 Participating Organizations in 125 countries, primarily developing and transition countries. IPEN brings together leading environmental and public health groups around the world to establish and implement safe chemicals policies and practices that protect human health and the environment. IPEN's mission is a toxics-free future for all.

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PREFACE

Lead paints for home use continue to be widely produced, sold, and used in developing countries despite the fact that most highly industrial countries banned lead paints for household use more than 40 years ago. IPEN and Participating Organizations are part of the global movement to eliminate lead paint by 2020 to protect children's health.

In 2007 and 2008, NGOs in the IPEN network collected and analyzed decorative (home use) 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 contained dangerously high lead levels. In response, IPEN launched its Global Lead Paint Elimination Campaign, which seeks to eliminate lead in paint and raise widespread awareness among business entrepreneurs and consumers about the adverse human health impacts of lead paint, particularly on the health of children. Since then, IPEN-affiliated NGOs and others have sampled and analyzed paints on the market in approximately 50 low- and middle-income countries.

This report presents new data on the total lead content of solvent-based paints for home use available on the market in Jamaica. It also presents background information on why the use of lead paint is a source of serious concern, especially to children's health; a review of national policy frameworks that are in place to ban or restrict the manufacture, import, export, distribution, sale and use of lead paint, and provides a strong justification to adopt and enforce further regulatory controls in Jamaica. Finally, it proposes action steps by different stakeholders to protect children and others from lead paint.

This study was conducted by The Caribbean Poison Information Network (CARPIN) in partnership with IPEN.

IPEN is an international NGO network of health and environmental organizations from all regions of the world of which CARPIN is a member. IPEN is a leading global organization working to establish and implement safe chemicals policies and practices to protect human health and the environment. Its mission is a toxics-free future for all. IPEN helps build the capacity of its member organizations to implement on-the-ground activities, learn from each other's work, and work at the international level to set priorities and achieve new policies.

The Caribbean Poison Information Network (CARPIN) is located at the University of Technology, Jamaica. It is a thirteen-year-old multi-sectorial initiative amongst several stakeholders in the health and education sectors. CARPIN was officially launched on Friday, May 13, 2005 during the inaugural Poison Prevention Week. The Network vision is to be the repository of poison information and a catalyst for poison prevention within the Caribbean Region. The Mission is to: preventing poisonings through public education, providing poison information to all clients in a timely manner, advocating for policies that will protect the health and welfare of the most vulnerable and at-risk populations to poisonings, and working with stakeholders to build regional cooperation in poison prevention and management.

EXECUTIVE SUMMARY

Lead is a toxic metal that causes adverse effects on both human health and the environment. While lead exposure is also harmful to adults, lead exposure harms children at much lower levels, and the health effects are generally irreversible and can have a lifelong impact.

The younger the child, the more harmful lead can be, and children with nutritional deficiencies absorb ingested lead at an increased rate. 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.

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.

Lead paint is a major source of childhood lead exposure. The term lead paint is used in this report to describe any paint to which one or more lead compounds have been added. The cut-off concentration for lead paint used in the report is 90 parts per million (ppm, dry weight of paint), the strictest legal limit enacted in the world today. All lead concentrations in the report are total lead levels, unless otherwise specified.

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. In Jamaica, there is currently no regulation in place limiting the amount of lead in paint for household and decorative use. However, The Early Childhood Regulation 2005, speaks about the prevention of lead exposure to children. Under Section 16, sub-section 5 (b), stipulates that the operator of an education institution should ensure that toys and other equipment that are accessed by children should be free of lead based paints and chipping paints.

From July to September 2018, CARPIN purchased a total of 36 cans of solvent-based paint sold for home use from stores in Kingston and St Catherine, Jamaica. Thirteen white paints, 12 red paints and 11 yellow paints were included in the study. The paints represented 15 different brands produced by seven manufacturers. All paints were analyzed by an accredited laboratory in

the United States of America for their lead content, based on dry weight of the paint. The laboratory participates in the Environmental Lead Proficiency Analytical Testing (ELPAT) program operated by the American Industrial Hygiene Association (AIHA), assuring the reliability of the analytical results.

RESULTS

Of the 36 analyzed solvent-based paints, 31 were decorative household paints and four were anti-corrosive paints. The final paint was a yellow imported industrial paint (Omni Mae Automotive Paint) sold over the counter for home use without any instructions from the seller about its usage. It did however have a warning on the label stating, "leaded" and "for professional use only—not intended for household use." The paint, manufactured by PPG Paints in the USA, contained 150,000 ppm of lead.

All remaining 35* paints contained lead concentrations below 90 parts per million (ppm, dry weight of paint). This is the regulatory limit for lead in decorative paint in e.g., India, the Philippines, and the United States of America. This suggests that the technology to produce paint without lead ingredients is widely implemented in Jamaica.

In general, paint can labels did not carry meaningful information about lead content or the hazards of lead paint. Only five out of 35 paints (14 percent of paints) provided information about lead on their labels. Manufacturing dates or batch numbers were included on the labels of 20 out of 35 paints (57 percent of paints) included in this study. Most warning symbols on the paint cans indicated the flammability of the paints, keep out of the reach of children, notation that these were poisonous, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.

CONCLUSIONS

This study demonstrates that the technology to produce solvent-based paints for home use without added lead is widely implemented in Jamaica. However, there are strong indications that industrial paints that contain dangerously high levels of lead are easily available and sold over the counter without guidance or instructions from the seller about its usage. The study results provide a strong justification to adopt and enforce a regulation that will ban the manufacture, import, export, distribution, sale and use of all paints, including industrial paints, with total lead concentrations greater than 90 ppm. While the study

* One paint (JAM-35) contained lead concentration "below 200 ppm." For this study, we classified this paint under the "below 90 ppm" category.

shows that decorative paints for home use are generally not manufactured with added lead in Jamaica, it is still important to establish regulations that covers ban on the use of lead in decorative architectural paints to avoid future use of lead in decorative paint as well as preventing lead decorative paint imports.

RECOMMENDATIONS

To address the issue of lead in paint in Jamaica, CARPIN and IPEN propose the following recommendations:

Government and Governmental Agencies

The Ministry of Economic Growth and Job Creation should immediately draft a regulation that will ban the manufacture, import, export, distribution, sale and use of all paints that contain total lead concentrations exceeding 90 ppm, the standard recommended in the Model Law and Guidance for Regulating Lead Paint,* developed by the Global Alliance to Eliminate Lead Paint (GAELP) and published by the UN Environment Programme. They should also require paint companies to display sufficient information indicating harmful content on paint can labels such as solvents and provide a warning on possible lead dust hazards when disturbing painted surfaces. Policies to ensure that industrial paint is only available for purchase and use by relevant industry representatives should be adopted. Sanctions should be imposed on non-compliant companies in adherence to standardized labeling as stipulated by the government. The Poison toll free number (888-764-7667) should be added to the section for First Aid on paint can labels.

Paint Industry

Paint companies that have shifted to non-lead paint production should get their products certified through independent, third party verification procedures to increase the customer's ability to choose paints with no added lead. Paint vendors should have the required technical knowledge to guide consumers on the intended usage of paints and consequent risk of exposure to toxic chemicals. Paints for industrial use must carry distinct labels easily visible to consumers indicating its usage.

Individual, Household and Institutional Consumers

Paint consumers should demand paints with no added lead from paint manufacturers and retailers, as well as full disclosure of a paint product's content.

* https://www.unenvironment.org/resources/publication/model-law-and-guidance-regulating-lead-paint

Household and institutional consumers should ask for, consciously buy, and apply only paints with no added lead in places frequently used by children such as homes, schools, day care centers, parks and playgrounds.

Organizations and Professional Groups

Public health groups, consumer organizations and other concerned entities should support the elimination of lead paint, and conduct activities to inform the public and protect children from lead exposure through lead paint, lead in dust and soil, and other sources of lead.

All Stakeholders

All stakeholders should come together and unite in promoting a strong policy that will eliminate lead paint in Jamaica.

1. BACKGROUND

1.1 HEALTH AND ECONOMIC IMPACTS OF LEAD EXPOSURE

Children are exposed to lead from paint when lead-containing paint on walls, windows, doors or other painted surfaces begins to chip or deteriorate, since this causes lead to be released to dust and soil. When a surface previously painted with lead paint is sanded or scraped in preparation for repainting, very large amounts of lead-contaminated dust is produced, which, when spread, can constitute a severe health hazard.[1]

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 dust or the soil is contaminated with lead, the children will ingest lead. Hand-to-mouth behavior

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. All lead concentrations in the report are total lead levels, unless otherwise specified.

is especially prevalent in children aged six years and under, the age group 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.[2]

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 paint chips is typically much higher than what is found in dust and soils. When toys, household furniture, or other articles are painted with lead paint, children may directly ingest the lead-contaminated, dried paint when chewing on them. Nonetheless, the most common way that children ingest lead is through lead-contaminated dust and soil that gets onto their hands.[3]

While lead exposure is also harmful to adults, lead exposure harms children at much lower levels. In addition, children absorb up to five times as much of ingested lead than adults. Children with nutritional deficiencies absorb ingested lead at even increased rates.[2]

The younger the child, the more harmful lead can be and the health effects are generally irreversible and can have a lifelong impact. The human fetus is the most vulnerable, and a pregnant woman can transfer lead that has accumulated in her body to her developing child.[4] Lead is also transferred through breast milk when lead is present in a nursing mother.[5]

Once lead enters a child's body through ingestion, inhalation, or across the placenta, it has the potential to damage several 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.[6] Lead is also categorized as an endocrine-disrupting chemical (EDC).[7]

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.[8]

According to the World Health Organization (WHO): "Lead has no essential role in the human body, and lead poisoning accounts for about 0.6 percent of the global burden of disease."[2] Evidence of reduced intelligence caused by childhood exposure to lead has led 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.[9]

In recent years, medical researchers have been documenting significant health impacts in children from lower and lower levels of lead exposure.[2, 6] According

to the factsheet on Lead Poisoning and Health from WHO: "There is no known level of lead exposure that is considered safe."[10]

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.[11] 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.[2] 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.

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* per year.[12] 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 percent of Gross Domestic Product (GDP);

Latin America and the Caribbean: $142.3 billion of economic loss, or 2.04 percent of GDP; and

Asia: $699.9 billion of economic loss, or 1.88 percent of GDP.

Country estimates used in this study can be accessed at a publicly available website, **http://www.med.nyu.edu/pediatrics/research/environmentalpediatrics/leadexposure**, and shows that ***economic loss in Jamaica is estimated at $387 million, or 1.77 percent of Gross Domestic Product (GDP).***

* 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.

1.2 THE USE OF LEAD IN PAINT

Paints contain high levels of lead when the paint manufacturer intentionally adds one or more leaded 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. Leaded paint ingredients are most commonly intentionally used in solvent-based paint due to their chemical properties, and solvent-based paints have been found to have high lead content in many countries.[13-15]

The leaded 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.

Leaded compounds may also be added to enamel paints for use as driers (sometimes called drying agents or drying catalysts). Leaded 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.

Non-leaded pigments, driers, and anti-corrosive agents have been widely available for decades, and are used by manufacturers producing the highest quality paints. When a paint manufacturer does not intentionally add lead compounds in the formulation of its paints, and takes care to avoid the use of paint ingredients that are contaminated with lead, the lead content of the paint will be very low—less than 90 parts per million (ppm) lead by dry weight, and frequently down to 10 ppm or less.

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints 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.

The use of lead in production of decorative paint is prohibited in the European Union through regulations related to safety of consumer products and specific prohibitions for most leaded raw materials. In the U.S., Canada, Australia and other countries with regulations restricting the use of leaded ingredients in decorative paint, standards specifying a maximum lead limit are in place. The

current standard for household paints in e.g., the U.S., the Philippines, and India is a total maximum lead content of 90 ppm, and adherence to this ensures that a manufacturer can sell its paint anywhere in the world. This standard is also recommended in the Model Law and Guidance for Regulating Lead Paint, which was developed by the Global Alliance to Eliminate Lead Paint (GAELP) and published by the UN Environment Programme. Some other countries such as Brazil, Uruguay and Argentina have established standards of 600 ppm total lead. Currently, Brazil is in the process of revising their lead paint legislation to include a 90-ppm total lead limit for all paint.

Countries are increasingly banning lead use in all types of paint. Some recent examples are the Philippines, Cameroon and Ethiopia, all of which adopted regulations that bans lead in industrial paints, including automotive paints, among others.[16]

1.3 PAINT MARKET AND REGULATORY FRAMEWORK IN JAMAICA

Paint Market in Jamaica

The value of the Jamaican paint market is unknown, but its main player is Berger Paints Jamaica Ltd. and followed by BH Paints. A survey in 2012 revealed Jamaican decorative architectural or house paint amounted to 8.3 million gallons of volume sales.

In the year 2016-2017, Berger Paints Jamaica Ltd. recorded net profit of J$ 315.555 million, compared to J$ 122.137 million earned in the prior year, an increase of 158 percent. Halfway through the year 2017-2018, net sales increased to J$ 2,363 million, an increase of 15 percent over the previous year.[17]

Berger Jamaica's closing stock price as of June 1, 2018 was 19.82, with a total market value of 4.2 billion on the Jamaica stock exchange. The company is owned by Asian Paints Ltd. of India and started business operation in Jamaica in 1953.

BH Paints put its hold on the market in the lower 20 percent range, the second biggest paint company after Berger Jamaica. BH Paints is distributed under the brand, BH, in Jamaica.

EdgeChem Jamaica Ltd., Diamond Paint, Sherwin-Williams West Indies Ltd., and ANSA McAl holds the remainder of the household decorative paint market.

EdgeChem Jamaica Ltd. is a locally-owned company founded in 1990. ANSA McAl sells the Sisson—reintroduced to Jamaica in 2014—and Penta lines in Jamaica through ANSA Coatings Ltd.

REGULATORY FRAMEWORK

Presently, there is no regulation that prohibits the use of lead in paint in Jamaica. However, there are the Public Health Act and the Draft Occupational Health and Safety Regulation that could be amended to include regulatory limits on lead in paint. These regulations are chosen because exposure to lead poses a public health risk and these specific legislations would have the relevant framework to include issues of lead that affect the health of the public. The key Ministries and Agencies that have the mandate to protect the health of the population from lead exposure are the Ministry of Health, the lead agency, and supported by the Bureau of Standards, and Ministry Economic Growth and Job Creation.

The *Model Law and Guidance for Regulating Lead Paint*,* a guidance framework on legal limits on lead in paint published by the United Nations Environmental Programme can be utilized and adopted to suit the country's regulatory context. The Model Law recommends a standard of 90 ppm total lead limit for all paints, including industrial paints.

As the world moves towards banning lead in all types of paints, it will be beneficial for the government to introduce a blanket ban on lead in all paints, including industrial paints such as anticorrosive paints, automotive paints, marine paints, spray paints and traffic paints, among others. For instance, it will be easier to control the market through import restrictions in addition to lead paint laws. The government expenditure in renovating or remediating structures with lead will be reduced as the production of lead paint decreases upon establishment of a lead paint law.

* https://www.unenvironment.org/resources/publication/model-law-and-guidance-regulating-lead-paint

2. MATERIALS AND METHODS

From July to September 2018, 36 cans of solvent-based paint intended for home use were purchased by CARPIN from various stores in Kingston and St Catherine, Jamaica. The paints represented 15 different brands produced by seven manufacturers, a majority of which were from Jamaica while a few were imported from Trinidad & Tobago and USA.

In most cases, one white paint and one or more bright-colored paint such as red or yellow were selected. Four anti-corrosive paints for consumer use were also included in this study. Additionally, one automotive industrial paint was included in the study. It was sold over the counter without guidance or instructions from the vendor about its usage. The availability of these paints in retail establishments suggested that they were intended to be used within home environments.

During the paint sample preparation, information such as color, brand, manufacturer, country where manufactured, product codes, production dates, and other details as provided on the label of the paint can were recorded. Generic paint colors were recorded, e.g., "yellow" instead of "canary yellow." For all col-

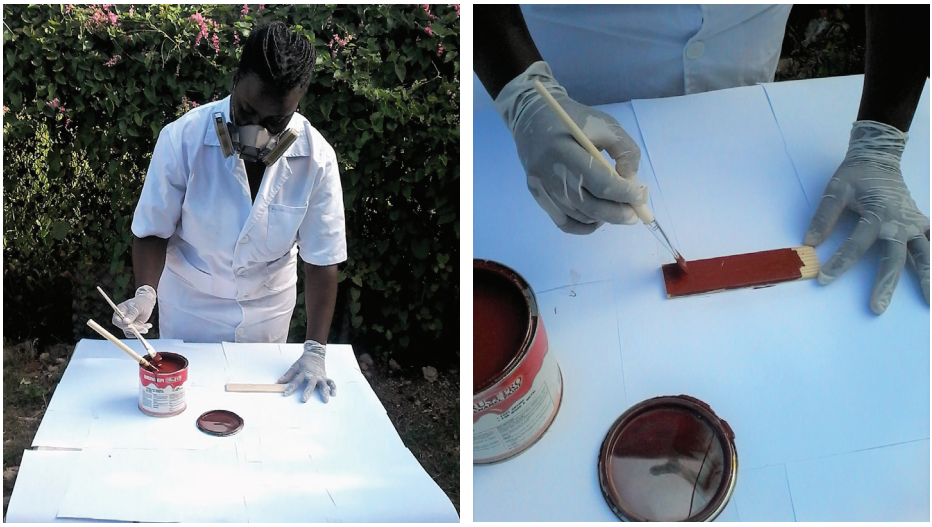

Figure 1. Staff of CARPIN conducting sample preparation.

ored paints, the protocol called for obtaining “bright” or “strong” red and yellow paints when available.

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 CARPIN 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, labeled wood pieces using different unused, single-use paintbrushes by a researcher of CARPIN as shown in Figure 1.

Each stirring utensil and paintbrush was used only for the same paint, 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 individually labeled, resealable plastic bags and shipped for analysis of lead content to Forensic Analytical Laboratories, Inc. in the United States of America. The laboratory participates in the Environmental Lead Proficiency Analytical Testing (ELPAT) Program operated by the American Industrial Hygiene Association. In the laboratory selection process, IPEN further assessed the reliability of the laboratory results by conducting an independent quality assurance testing. This was made by sending paint samples with a known lead content to the laboratory, and evaluating the results received.

The laboratory’s lower limit of detection for the lead concentration in the paint samples is dependent on the amount of paint in the samples. Generally, the lowest detection limit for the method used is 60 ppm, but if only a small amount of paint is available, the detection limit increases. Therefore, the detection limit was higher (up to 200 ppm) for one of the sample.

The paint samples were analyzed using method EPA3050B/7000B, i.e., through acid digestion of the samples, followed by Flame Atomic Absorption Spectrometry, as recognized by the WHO as appropriate for the purpose.[18]

3. RESULTS

3.1 SUMMARY OF RESULTS

This study shows that:

- Of the 36 analyzed solvent-based paints, 31 were decorative household paints, four were anti-corrosive paints, and one was an automotive industrial paint.
- All 35* analyzed solvent-based paints intended for home use contained lead concentrations below 90 ppm.
- The yellow industrial paint (Omni Mae Automotive Paint) included in this study since it was sold for home use contained 150,000 ppm of lead.
- Only five out of 35 paints (14 percent of paints) provided information about lead on their labels, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.

3.2 LEAD CONTENT AND PAINT BRAND ANALYSIS

All 35 analyzed solvent-based paints intended for home use contained lead concentrations below 90 ppm, which indicates that the technology to manufacture paints without added lead is widely implemented in Jamaica.

In addition, all 14 analyzed decorative paint brands (100 percent of paint brands) sold at least one paint with lead concentrations below 90 ppm. Most of these brands were locally manufactured in Jamaica, while a few paints were imported from Trinidad & Tobago and the USA.

An industrial automotive paint (Omni Mae) manufactured by PPG Paints in the USA and imported into Jamaica contained 150,000 ppm of lead. This shows that industrial paints with dangerously high levels of lead are sold over the counter together with household paints in paint stores in Jamaica.

Thirty-one solvent-based decorative paints from 11 brands manufactured by the following paint companies contained lead concentrations below 90 ppm: ANSA Coatings (Jamaica); B-H Paints (Jamaica); Berger Paints (Jamaica); EdgeChem

* One paint (JAM-35) contained lead concentration "below 200 ppm." For this study, we classified this paint under the "below 90 ppm" category.

(Jamaica); Lanco Mfg. Corp. (Trinidad & Tobago, USA); and Sherwin-Williams (Jamaica).

Four anti-corrosive paints from three brands manufactured by the following paint companies contained lead concentrations below 90 ppm: Berger (Jamaica); B-H Paints (Jamaica); and EdgeChem (Jamaica). This indicates that the technology to produce paints without added lead is widely implemented in Jamaica.

3.3 LABELING

In general, most paint can labels did not carry meaningful information about lead content or the hazards of lead paint.

Only five out of 35 paints (14 percent of paints) provided information about lead on their labels.

The automotive industrial paint (Omni Mae) with "leaded" label on paint can contained 150,000 ppm lead. This paint also carried a warning on the label stating, "for professional use only—not intended for household use" as seen in Figure 2. However, this warning seemed inefficient since the paint was sold for

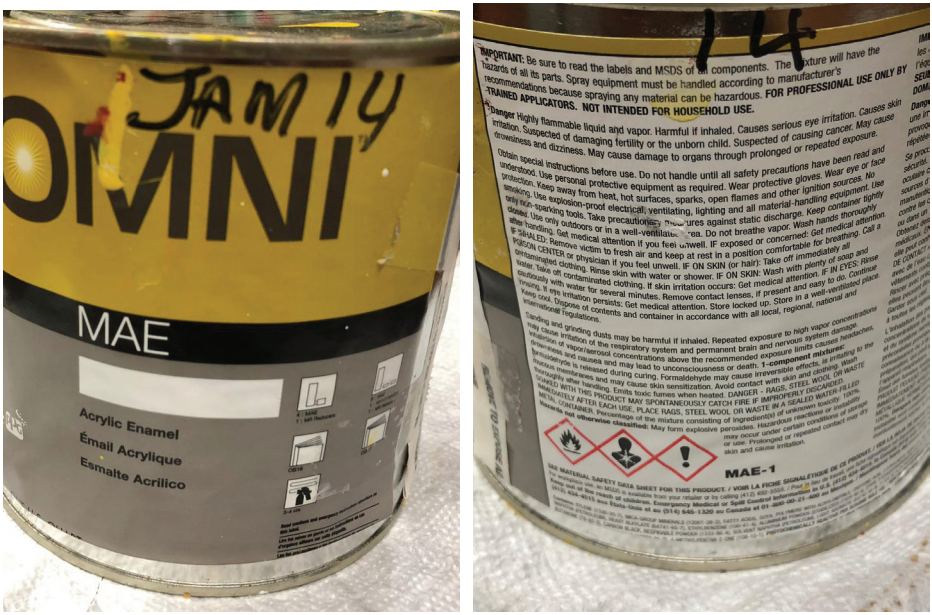

Figure 2. Labeling of Omni Mae Paint Manufactured by PPG Paints USA.

home use on retail stores intended for decorative household paints. Customers are unaware of these warnings and, most of the time, will not read wordy warnings in small font sizes. If there are no guidance or instructions given to customers from the seller, dangerously high lead-containing industrial paints may be mistaken by unsuspecting buyers as decorative household paints since they are also sold in small containers and placed in shelves together with other decorative paints.

Manufacturing dates or batch numbers were included on the labels of 20 out of 35 paints (57 percent of paints) included in this study. Most warning symbols on the paint cans indicated the flammability of the paints, keep out of the reach of children, notation that these were poisonous, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.

4. CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that the technology to produce solvent-based paints for home use without added lead is widely implemented. However, there are strong indications that industrial paints that still contain dangerously high levels of lead are easily available and sold over the counter without guidance or instructions from the seller about its usage. The study results provide a strong justification to adopt and enforce a regulation that will ban the manufacture, import, export, distribution, sale and use of all paints, including industrial paints, with total lead concentrations greater than 90 ppm. While the study shows that decorative paints for home use are generally not manufactured with added lead in Jamaica, it is still important to establish regulations that covers ban on the use of lead in decorative architectural paints to avoid future use of lead in decorative paint, as well as preventing lead decorative paint imports.

To address the issue of lead in paint in Jamaica, CARPIN and IPEN propose the following recommendations:

Government and Government Agencies

The Ministry of Economic Growth and Job Creation should immediately draft a regulation that will ban the manufacture, import, export, distribution, sale and use of all paints that contain total lead concentrations exceeding 90 ppm, the standard recommended in the *Model Law and Guidance for Regulating Lead Paint*,* developed by the Global Alliance to Eliminate Lead Paint (GAELP) and published by the UN Environment Programme. They should also require paint companies to display sufficient information indicating harmful content on paint can labels such as solvents and provide a warning on possible lead dust hazards when disturbing painted surfaces. Policies to ensure that industrial paint is only available for purchase and use by relevant industry representatives should be adopted. Sanctions should be imposed on non-compliant companies in adherence to standardized labeling as stipulated by the government. The Poison toll free number (888-764-7667) should be added to the section for First Aid on paint can labels.

* https://www.unenvironment.org/resources/publication/model-law-and-guidance-regulating-lead-paint

PAINT INDUSTRY

Paint companies that have shifted to non-lead paint production should get their products certified through independent, third party verification procedures to increase the customer's ability to choose paints with no added lead. Paint vendors should have the required technical knowledge to guide consumers on the intended usage of paints and consequent risk of exposure to toxic chemicals. Paints for industrial use must carry distinct labels easily visible to consumers indicating its usage.

Individual, Household and Institutional Consumers

Paint consumers should demand paints with no added lead from paint manufacturers and retailers, as well as full disclosure of a paint product's content. Household and institutional consumers should ask for, consciously buy, and apply only paints with no added lead in places frequently used by children such as homes, schools, day care centers, parks and playgrounds.

Organizations and Professional Groups

Public health groups, consumer organizations and other concerned entities should support the elimination of lead paint, and conduct activities to inform the public and protect children from lead exposure through lead paint, lead in dust and soil, and other sources of lead.

All Stakeholders

All stakeholders should come together and unite in promoting a strong policy that will eliminate lead paint in Jamaica.

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APPENDIX

TABLE 1. SOLVENT-BASED PAINTS FOR HOME USE INCLUDED IN THE STUDY.

Sample No.	Brand	Color	Volume (L)	Price (JMD)	Date of Manufacture (y/m/d)	Batch No.	Date of Purchase (y/m/d)	Is there website on label?
JAM-36	Kem-Enamel	red	0.95	1192.42	N/A	N/A	11/7/18	No
JAM-06	Kem-Enamel	yellow	0.95	1583.33	N/A	N/A	6/7/18	No
JAM-19	Kem-Enamel	red	0.95	1148.48	N/A	N/A	6/7/18	No
JAM-05	Kem-Enamel	white	0.95	1184.85	N/A	N/A	6/7/18	No
JAM-28	Sherwin-Williams Industrial Enamel	white	0.95	1683.33	N/A	N/A	6/7/18	No
JAM-17	Kem-Enamel	yellow	0.95	1622.73	N/A	N/A	11/7/18	No
JAM-31	Berger 404	white	0.95	925.00	N/A	F5089W25000D	6/7/18	No
JAM-37	Rust Pro Premium Enamel (anti-corrosive)	red	0.95	1169.70	N/A	F2026R05100D	6/7/18	No
JAM-25	Berger 404	red	0.95	930.41	N/A	F5089R03800D	6/7/18	No
JAM-16	Berger 404	yellow	0.95	697.81	N/A	N/A	11/7/18	No
JAM-04	Rust Pro Premium Enamel (anti-corrosive)	white	0.95	3381.16	N/A	F2026W10000D	6/7/18	No
JAM-12	Color Glow	white	0.95	1075.00	N/A	55471618	11/7/18	No
JAM-02	EdgeChem Red Oxide Primer (anti-corrosive)	red	0.95	845.59	N/A	815757015957	6/7/18	No
JAM-43	Edgecolac	white	0.95	925.00	N/A	73145912	6/7/18	No
JAM-45	Color Glow	yellow	0.95	765.00	N/A	10522197	10/7/18	No
JAM-42	Edgecolac	red	0.95	930.41	N/A	N/A	6/7/18	No
JAM-23	Color Glow	red	0.95	1169.70	N/A	N/A	6/7/18	No
JAM-34	Edgecolac	red	0.95	771.25	N/A	105195617	11/7/18	No

Sample No.	Brand	Color	Volume (L)	Price (JMD)	Date of Manufacture (y/m/d)	Batch No.	Date of Purchase (y/m/d)	Is there website on label?
JAM-35	EdgeChem Quick Dri Industrial Enamel	white	0.95	1070.31	N/A	5546311	6/7/18	No
JAM-38	Perma	white	0.95	1416.31	N/A	708018204820	10/7/18	No
JAM-46	Perma	red	0.95	974.25	N/A	708018205669	10/7/18	No
JAM-32	Perma	white	0.95	974.25	N/A	H84104949	10/7/18	No
JAM-26	Excel	red	4	2575.11	N/A	HJ179056	10/7/18	No
JAM-11	Excel	white	4	2575.11	N/A	J182054	10/7/18	No
JAM-09	Perma	yellow	0.95	974.25	N/A	1710-012	10/7/18	No
JAM-07	Rust Chem (anti-corrosive)	white	0.95	1027.47	N/A	7080181211431	10/7/18	No
JAM-14	Omni Mae (automotive industrial)	yellow	0.95	2417.00	N/A	83033	12/7/18	No
JAM-20	Lanco	white	0.95	1734.00	N/A	N/A	12/7/18	No
JAM-18	Lanco	red	0.95	1714.00	N/A	N/A	12/7/18	No
JAM-13	Lanco	yellow	0.95	1714.00	N/A	N/A	12/7/18	No
JAM-30	Stacote A-400	yellow	4	3353.10	N/A	N/A	6/9/18	No
JAM-08	Lanco	yellow	0.95	1256.00	N/A	N/A	12/7/18	No
JAM-22	Penta	yellow	0.95	990.56	N/A	PBA30392	10/7/18	No
JAM-24	Penta	red	0.95	990.56	N/A	PBA29600	10/7/18	No
JAM-01	Penta	white	0.95	921.51	N/A	PBA2893	10/7/18	No
JAM-21	Penta Flat Emulsion	yellow	0.95	912.51	N/A	N/A	10/7/18	No

TABLE 2. RESULTS OF LABORATORY ANALYSIS OF SOLVENT-BASED PAINTS FOR HOME USE.

Sample No.	Brand	Color	Lead Content, Dry Weight (ppm)	Country of Brand Headquarters	Country of Manufacture	Is there information on can about lead content of paint?
JAM-36	Kem-Enamel	red	Below 60	Jamaica	Jamaica	Yes. "Lead Free"
JAM-06	Kem-Enamel	yellow	Below 60	Jamaica	Jamaica	Yes. "Lead Free"
JAM-19	Kem-Enamel	red	Below 60	Jamaica	Jamaica	Yes. "Lead Free"
JAM-05	Kem-Enamel	white	Below 60	Jamaica	Jamaica	Yes. "Lead Free"
JAM-28	Sherwin-Williams Industrial Enamel	white	Below 60	Jamaica	Jamaica	No
JAM-17	Kem-Enamel	yellow	Below 60	Jamaica	Jamaica	Yes. "Lead Free"
JAM-31	Berger 404	white	Below 60	Jamaica	Jamaica	No
JAM-37	Rust Pro Premium Enamel (anti-corrosive)	red	Below 60	Jamaica	Jamaica	No
JAM-25	Berger 404	red	Below 60	Jamaica	Jamaica	No
JAM-16	Berger 404	yellow	Below 60	Jamaica	Jamaica	No
JAM-04	Rust Pro Premium Enamel (anti-corrosive)	white	Below 60	Jamaica	Jamaica	No
JAM-12	Color Glow	white	Below 60	Jamaica	Jamaica	No
JAM-02	EdgeChem Red Oxide Primer (anti-corrosive)	red	Below 60	Jamaica	Jamaica	No
JAM-43	Edgecolac	white	Below 60	Jamaica	Jamaica	No
JAM-45	Color Glow	yellow	Below 60	Jamaica	Jamaica	No
JAM-42	Edgecolac	red	Below 60	Jamaica	Jamaica	No
JAM-23	Color Glow	red	Below 60	Jamaica	Jamaica	No
JAM-34	Edgecolac	red	Below 60	Jamaica	Jamaica	No
JAM-35	EdgeChem Quick Dri Industrial Enamel	white	Below 200	Jamaica	Jamaica	No
JAM-38	Perma	white	Below 60	Jamaica	Jamaica	No
JAM-46	Perma	red	Below 60	Jamaica	Jamaica	No
JAM-32	Perma	white	Below 60	Jamaica	Jamaica	No
JAM-26	Excel	red	Below 60	Jamaica	Jamaica	No

Sample No.	Brand	Color	Lead Content, Dry Weight (ppm)	Country of Brand Headquarters	Country of Manufacture	Is there information on can about lead content of paint?
JAM-11	Excel	white	Below 60	Jamaica	Jamaica	No
JAM-09	Perma	yellow	Below 60	Jamaica	Jamaica	No
JAM-07	Rust Chem (anti-corrosive)	white	Below 60	Jamaica	Jamaica	No
JAM-14	Omni Mae (automotive industrial)	yellow	150000	USA	USA	Yes. "Leaded"
JAM-20	Lanco	white	Below 60	USA	USA	No
JAM-18	Lanco	red	Below 60	Trinidad & Tobago	Trinidad & Tobago	No
JAM-13	Lanco	yellow	Below 60	Trinidad & Tobago	Trinidad & Tobago	No
JAM-30	Stacote A-400	yellow	Below 60	Jamaica	Jamaica	No
JAM-08	Lanco	yellow	Below 60	USA	USA	No
JAM-22	Penta	yellow	Below 60	Trinidad & Tobago	Jamaica	No
JAM-24	Penta	red	70	Trinidad & Tobago	Jamaica	No
JAM-01	Penta	white	Below 60	Trinidad & Tobago	Jamaica	No
JAM-21	Penta Flat Emulsion	yellow	Below 60	Trinidad & Tobago	Jamaica	No

TABLE 3. DISTRIBUTION OF LEAD CONCENTRATION BY BRAND.

Brand	No. of Samples	No. of Samples Above 90 ppm	No. of Samples Above 10,000 ppm	Minimum Lead Content (ppm)	Maximum Lead Content (ppm)
Berger 404	3	0	0	Below 60	Below 60
Color Glow	3	0	0	Below 60	Below 60
EdgeChem Quick Dri Industrial Enamel	1 (white)	0	0	Below 200	Below 200
EdgeChem Red Oxide Primer (anti-corrosive)	1 (red)	0	0	Below 60	Below 60
Edgecolac	3	0	0	Below 60	Below 60
Excel	2	0	0	Below 60	Below 60
Kem-Enamel	5	0	0	Below 60	Below 60
Lanco	4	0	0	Below 60	Below 60
Penta	4	0	0	Below 60	70
Perma	4	0	0	Below 60	Below 60
Rust Chem (anti-corrosive)	1 (white)	0	0	Below 60	Below 60
Rust Pro Premium Enamel (anti-corrosive)	2	0	0	Below 60	Below 60
Sherwin-Williams Industrial Enamel	1 (white)	0	0	Below 60	Below 60
Stacote A-400	1 (yellow)	0	0	Below 60	Below 60
Omni Mae (automotive industrial)	1 (yellow)	1	1	150,000	150,000

TABLE 4. DISTRIBUTION OF LEAD CONCENTRATION BY COLOR.

Color	No. of Samples	No. of Samples Above 90 ppm	No. of Samples Above 10,000 ppm	Minimum Lead Content (ppm)	Maximum Lead Content (ppm)
White	13	0	0	Below 60	Below 200
Red	12	0	0	Below 60	70
Yellow*	11	1	1	Below 60	150,000

** Includes one automotive industrial paint with 150,000 ppm lead.*

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