



# LEAD IN SOLVENT-BASED PAINTS FOR HOME USE IN NIGERIA



July 2017



SRAdev Nigeria



SWEDEN



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The analytical study providing data to this report was undertaken as part of the Lead Paint Elimination Project in Africa, funded by the Global Environment Facility (GEF), implemented by UN Environment and executed by IPEN. The Lead Paint Elimination Project in Africa 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 household enamel paints, particularly on the health of children under six years old. The study was conducted in Nigeria by Sustainable Research and Action for Environmental Development (SRADev Nigeria) in partnership with IPEN.

This report was developed by SRADev Nigeria and IPEN as part of IPEN's Global Lead Paint Elimination Campaign and funded by the Swedish Government.

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Established in 1998, IPEN is currently comprised of over 500 Participating Organizations in 116 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.



*Prepared by Leslie Adogame, Executive Director, SRADev Nigeria  
Researched and Drafted by Victor Fabunmi and Faith Osa-Egharevba, Project Officers,  
SRADev Nigeria*

**Sustainable Research and Action for  
Environmental Development  
(SRADev Nigeria)**

Suite 1, No-18, Olorunlogbon Street,  
Anthony Village, Lagos, Nigeria  
Tel.: +234-8033301305, +234-702528319  
Email: [sradevnigeria@yahoo.com](mailto:sradevnigeria@yahoo.com)



**SRADev Nigeria**

Website: [www.sradev.org](http://www.sradev.org)

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**Cover Photo Credit:** Students participate in an activity to promote the use of lead-free paints in schools in Nigeria. *Photo courtesy of the Eyes on the Future Schools (EOTFS), Lagos, Nigeria.*

# 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 40 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 Nigeria. 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 Nigeria. Finally, it proposes action steps by different stakeholders to protect children and others from lead paint.

This study was conducted by Sustainable Research and Action for Environmental Development (SRADev Nigeria) in partnership with IPEN.

IPEN is an international NGO network of health and environmental organizations from all regions of the world of which SRADev Nigeria 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.

SRADev Nigeria is a professional, research and advocacy based national NGO. It acts as a catalyst, advocate, and educator to promote sustainable development through facilitating sound environmental practice, exchange of information, building bridges of understanding on environmental health and natural resource conservation in a sustainable way with a mission to ensure that the local people are put on the drivers' seat in sustainable management. SRADev Nigeria is the Strategic Approach to International Chemicals Management (SAICM) NGO focal point on chemicals management in Nigeria recognized by the United Nations Environment.

# 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. 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 Nigeria, there is currently no regulation in place limiting the amount of lead in paint for household and decorative use.

From July to August 2016, SRADev Nigeria purchased a total of 54 cans of solvent-based paint intended for home use from stores in Lagos, Nigeria. The paints represented 18 different brands produced by 16 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

40 out of 54 analyzed solvent-based paints for home use (74 percent of paints) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm, dry weight of paint). This is also the regulatory limit for lead in decorative paint in e.g., India, Philippines, and the United States of America. Moreover, 29 paints (54 percent of paints) contained dangerously high lead concentrations above 10,000 ppm. The highest lead concentration detected was 160,000 ppm in a yellow Finecoat Paint sold for home use.

On the other hand, 14 out of 54 solvent-based paints for home use (26 percent of paints) contained lead concentrations below 90 ppm, suggesting that the technology to produce paint without lead ingredients exists in Nigeria.

16 out of 18 analyzed brands (89 percent of paint brands) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. The same number of brands sold at least one lead paint with dangerously high lead concentrations above 10,000 ppm.

Yellow paints most frequently contained dangerously high lead concentrations above 10,000 ppm. Of 18 yellow paints, 16 (89 percent of yellow paints) contained lead levels at or above 10,000 ppm; of 18 red paints, 12 (67 percent of red paints) contained lead levels at or above 10,000 ppm; and 1 white paint (6 percent of white paints) contained lead level above 10,000 ppm.

In general, paint can labels did not carry meaningful information about lead content or the hazards of lead paint. Only 3 out of 54 paints (6 percent of paints) provided information about lead on their labels and most paints carried little information about any ingredients on can labels. Most paints were merely labeled as “solvents, pigments and resin,” with no further details on the type of solvents and pigments (organic or inorganic) provided on paint can labels. Manufacturing dates or batch numbers were included on the labels of 35 out of 54 paints (65 percent of paints) included in this study. Most warning symbols on the paint cans indicated the flammability of the paints, but had no precautionary warnings on the effects of lead dust to children and pregnant women were provided.

Lead levels in this study are consistent with the results of a similar paint study conducted by SRADev Nigeria in 2009. In that study, 23 solvent-based paints from 6 brands were purchased and analyzed. In the previous study, all paints (100 percent of paints) contained lead levels above 90 ppm, while 15 of 23 paints (65 percent of paints) contained lead levels above 10,000 ppm.

A comparison between the two studies showed some improvement as the percentage of paints with lead content above 10,000 ppm decreased from 65 percent in the previous study to 54 percent in the current study, as did the percentage of paints with lead content exceeding 90 ppm from 100 percent in the previous study to 74 percent in the current study. The highest level of lead was in the same range in both studies—130,000 ppm in 2009 and 160,000 ppm in 2017—indicating that the lead content was more than 10 percent of the dry weight of the paint.

## CONCLUSIONS

This study demonstrates that solvent-based paints for home use with high concentrations of lead are widely available in Nigeria since the paints included in this study are brands commonly sold in retail stores all over Nigeria. However, the fact that 14 out of 54 paints (26 percent of paints) contained lead concentrations below 90 ppm indicates that the technology to produce paints without added lead exists in Nigeria. 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 paints with total lead concentrations greater than 90 ppm.

## RECOMMENDATIONS

To address the problem of lead in paint, SRADev Nigeria and IPEN propose the following recommendations:

### ***Government and Government Agencies***

The Federal Ministry of Environment (FMEnv), in collaboration with the Standards Organisation of Nigeria (SON), should immediately draft a regulation that will ban the manufacture, import, export, distribution, sale and use of paints that contain total lead concentrations exceeding 90 ppm, the most restrictive standard in the world. 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.

### ***Paint Industry***

Paint companies that still produce lead paints should expeditiously stop the use of leaded paint ingredients in paint formulations. 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. They should also provide information about the lead content of their products on paint can labels.

### ***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 and protect children from lead exposure through lead paint, lead in dust and soil, and other sources of lead.

### ***Civil Society and NGOs***

NGOs and other civil society organizations, together with other professional groups, should collaborate with government agencies to carry out awareness-raising campaigns to sensitize the public on the dangers associated with elevated lead levels in the blood, possible sources of lead exposure, and availability of possible technically superior and safer alternatives. There is a need to raise awareness and take precautions when preparing a previously painted surface for repainting; train people, e.g., painters working on previously-painted surfaces about lead-safe work practices; and raise the needed resources to conduct such trainings. Campaigns that will empower consumers' right to know the lead content of paints they purchase should be encouraged.

### ***All Stakeholders***

All stakeholders should come together and unite in promoting a strong policy that will eliminate lead paint in Nigeria. Stakeholders are encouraged to foster voluntary initiatives by paint manufacturers, importers of paints and paint chemicals, and vendors to phase-out the use of lead compounds in their products, even before any national legal instrument is adopted or enforced.

# 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.<sup>[1]</sup>

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 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.<sup>[2]</sup>

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.<sup>[3]</sup>

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 an even increased rates.<sup>[2]</sup>

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.<sup>[4]</sup> Lead is also transferred through breast milk when lead is present in a nursing mother.<sup>[5]</sup>

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

## 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.



can also affect the blood system, the kidneys, and the skeleton.<sup>[6]</sup> Lead is also categorized as an endocrine-disrupting chemical (EDC).<sup>[7]</sup>

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.<sup>[8]</sup>

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.”<sup>[2]</sup> 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.<sup>[9]</sup>

In recent years, medical researchers have been documenting significant health impacts in children from lower and lower levels of lead exposure.<sup>[2, 6]</sup> According to the factsheet on Lead Poisoning and Health from WHO: “There is no known level of lead exposure that is considered safe.”<sup>[10]</sup>

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.<sup>[11]</sup> 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.<sup>[2]</sup> 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.<sup>[12]</sup> 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:** Intl\$134.7 billion of economic loss, or 4.03 percent of Gross Domestic Product (GDP);

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

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

Country estimates used in this study can be accessed at a publically available website, <http://www.med.nyu.edu/pediatrics/research/environmentalpediatrics/leadexposure>, and shows that *economic loss in Nigeria is estimated at Intl\$16.2 billion, or 3.94 percent of Gross Domestic Product (GDP).*

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\* 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.<sup>[13-15]</sup>

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 also may 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. Some other countries such as Brazil, South Africa, and Sri Lanka have established standards of 600 ppm total lead.

## 1.3 PAINT MARKET AND REGULATORY FRAMEWORK IN NIGERIA

### *1.3.1 The Paint Market Economy*

In Nigeria, paint manufacturing commenced with the establishment of four paint companies in 1962:

- Askar Paints Nigeria Ltd at Ibadan (an outpost of Haifa Paints Israel);
- ICI Exports Ltd (Chemical and Allied Products Plc);
- British Paints (Berger Paints Nigeria Plc); and
- International Paints (International Paints West Africa Plc).

Before 1962, the bulk of paints consumed in Nigeria were imported mainly from UK and France. The 1980s, however, witnessed an increased plethora of indigenous paint manufacturing outfits—both registered and unregistered—especially in the decorative and household paints industry, while the big multinational companies remained the major players in the marine and automotive coatings industry. The big companies comprising less than 10 percent of the total number of paint manufacturers in the country, control about 50 percent of the market, while the remaining 50 percent market share are divided among the rest.

The Nigerian paint and coatings industry is not highly regulated. There are over a thousand companies producing paints in the country. The Paints Manufacturers Association of Nigeria (PMA), a sub-sector of the Chemical and Pharmaceuticals sectorial group of the Manufacturers Association of Nigeria (MAN), is an association of companies engaged in the manufacturing of paints and related products throughout the country. Established in 1982, the Association now has more than two hundred registered members in its fold and an estimated five hundred unregistered members.

The Nigerian paint and coatings industry is divided into organized and unorganized sectors. The organized sector consists of companies with adequate access to capital and an increasingly effective distribution network. Inadequate access to funds and technical expertise required for industrial coatings is a major factor we used in differentiating market players. Under the decorative coatings

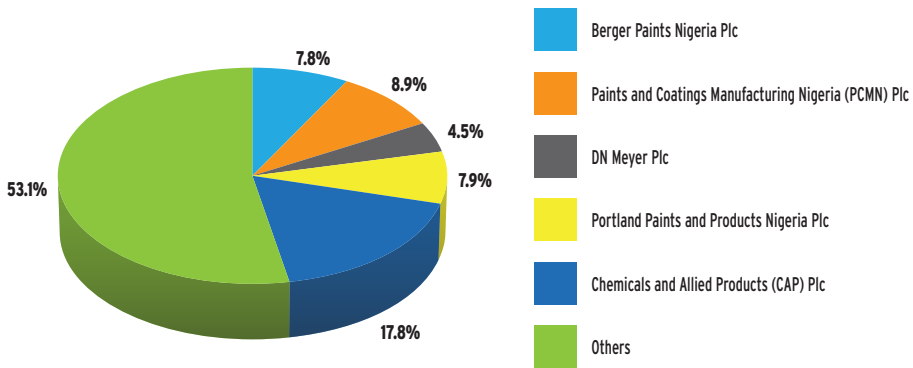
industry, both organized and unorganized players are present as it does not require heavy technological investments. Lenient government policies make it easy for new players to enter the market resulting in a large number of players in the Nigerian paints and coatings industry. The decorative coatings industry is comprised of about five big companies with annual revenues exceeding \$7 million, and numerous small- and medium-sized companies nationwide.

According to Frost & Sullivan (2014),<sup>[21]</sup> the Nigerian paints and coatings market was worth an estimated \$200 million in 2012. Growing by an estimated Compound Annual Growth Rate (CAGR) of 9.01 percent, the market was an estimated \$218 million in 2013 and would have reached \$238 million in 2014. Due to a significant number of unorganized players, estimating production capacity and sales volumes are difficult. In 2015, it had an annual value investment of over ₦25 billion (\$126 million ) ranging from heavy coatings, car finishes and refinishes, wood lacquers, industrial coatings, poly-urethanes, acrylics, epoxies, machinery enamels, adhesives, and decorative finishes. It is anticipated that the sales value in the industry will reach an estimated \$400 million in 2020, using a CAGR of 9.01 percent.

Decorative paints remain an integral part of the Nigerian paints and coatings market mainly due to a booming real estate industry in the country. According to a report from Frost & Sullivan, decorative paints and coatings accounted for about 71 percent of the total paint production volume in 2012, which is estimated to be about 91 million litres, and worth roughly \$120 million. On the other hand, industrial paints and coatings accounted for an estimated 29 percent of the total production volumes. According to SRADev Nigeria's recent survey, the market consists of both local and foreign brands although more local brands dominate the market, each serving the needs of the various income classes across the population.

There are numerous paints and coatings companies operating at varying capacities and scale in different parts of the country. However, the competitive nature of the industry and the fact that some of the companies lack good distribution network and access to financing means very few companies dominate the paints and coatings market. Some leaders in the Nigeria paint industry include Chemical and Allied Products Plc (CAP Plc), Berger Paints Nigeria Plc, DN Meyer Plc, Portland Paints and Products Nigeria Plc, and International Paints West Africa Plc (IPWA).

Although the market is highly fragmented, the following five companies account for approximately 47 percent of total revenues generated by the paints and coatings industry in 2013: Chemicals and Allied Products (CAP) Plc, Paints and Coatings Manufacturing Nigeria (PCMN) Plc, Portland Paints and Prod-



**Figure 1. Share of total revenue in the Nigerian paints and coatings market.<sup>[19]</sup>**

ucts Nigeria Plc, Berger Paints Nigeria Plc, and DN Meyer Plc. As shown in Figure 1, these are all local companies with a strong international component.

For example, *Chemical and Allied Products (CAP) Plc* evolved from the world-renowned British multinational company, Imperial Chemical Industries Plc, which formalized its Nigerian operations in 1957 under ICI Exports Limited to what is now known today as CAP Plc. The company markets Akzo Nobel's Dulux brand in Nigeria through 19 agents, and is involved in promoting its own Caplux brand. CAP Plc currently ranks first in terms of total revenues generated by any company in the paints and coatings business in Nigeria.

*Paints & Coatings Manufacturing Nigeria Plc (PCMN)* commenced business in Nigeria in 2001 in Port Harcourt as the sole distributor of International Paints Protective Coatings and Marine Coatings. Presently, the company is one of the most important companies in Nigeria when it comes to industrial coatings. The company is ranked second in terms of total market revenues generated in the country.

*Portland Paints and Products Nigeria Plc* was incorporated in 1985 and listed on the Nigeria stock exchange in 2009. The company became a subsidiary of UAC of Nigeria Plc. The company manufactures locally and represents a couple of international companies such as Hempel Marine/Protective Coatings produced by Hempel Denmark, Crown Trade Coatings produced by Crown Paints UK, and the Sandtex brands which the company produces locally and interna-



tionally on their behalf by Crown Paints UK. The company is ranked third in terms of total market revenues generated.

*Berger Paints Nigeria Plc* was founded in 1969 and the company is involved in manufacturing, development, distribution and sale of industrial and decorative paints and coatings. In 2012, Berger Paints Nig. Plc entered a partnership arrangement with the biggest paint company in South Korea, KCC Corporation, to jointly serve the Nigerian paints and coatings market. In 2012, Frost & Sullivan ranked the company first in terms of total annual production volumes. Based on revenues generated in 2013, the firm was the fourth biggest paints and coatings company in Nigeria.

*DN Meyer Plc* was incorporated on the 20th of May 1960, and converted to a Public Company in 1979. The company currently serves the industrial and decorative coatings industry in Nigeria. The company is ranked fifth in terms of revenues generated.

### **1.3.2 Imported Paints**

The Nigerian government permits the importation of paints and coatings into the country, although the government is currently putting in place a number of regulatory measures such as increasing import levies in order to encourage local production. As a result, paints and coating importation into Nigeria usually conducted by the biggest companies have been reduced considerably and even then, these brands can be considered premium/luxury products considering the general standard of living and income levels.

According to UNcomtrade, the value of paints and coatings imported into Nigeria in 2012 was an estimated \$52.6 million. This means imports accounted for about 26.3 percent of the total market in 2012. A significant amount of this importation is done by the biggest paints and coatings companies like PCMN Plc and Portland Paints Plc.

Today, majority of these imported paints are industrial paints and are often sold directly to companies than to small individual retailers. The top foreign paints brands in Nigeria are listed in Table 1.

**TABLE 1: POPULAR IMPORTED AND LICENSED BRANDS IN NIGERIA.**

<b>Brand Name</b>	<b>Company</b>	<b>Paint and Coating Industry</b>
Hammerite Metal Paints	Akzo Nobel (UK)	Decorative
Dulux	Akzo Nobel	Decorative
Sikkens	Akzo Nobel	Auto Refinishes
Crown Paints	Crown Paints (UK)	Decorative
Nippon Paints	Nippon Paints (Japan)	Coil Coatings
International Protective Coatings	International	Protective and Marine Coatings
Hempel	Hempel Coatings	Protective and Marine Coatings
KCC	KCC Corporation	Protective and Marine Coatings
Brolac	Brolac/Berger Ltd (UK)	Decorative, Protection and Marine Coatings
MaxMeyer Paints	MaxMeyer® (USA)	Auto Refinishes

*Source: Author's field survey (adapted from ICCPEA, 2014).*

### **1.3.3 Existing Regulatory Framework**

Currently, Nigeria has no official standard or limit for lead in paints, as standards and policies with regards to the industry are still unclear. This leaves the public at the mercy of paint manufacturers.

The major problems of the paint industry have not been entirely exogenous to the paint making sector. Some of the problems originated from fraud producers and fake colour matchers who manufacture paints using drum and stick paddles as mixers in their backyards with absolute disregard for any standards. They cash in on the prevalent abject poverty and ignorance of consumers to market their products as decorative paints. Although the rise in number of low-quality paint manufacturers boosted the growth of cottage industries by promoting entrepreneurship and self-employment, it has also sacrificed the quality of paint products sold in the market.

Under the NESREA Act of 2007, The National Environmental Standards and Regulations Enforcement Agency (NESREA), an agency of the Federal Ministry of Environment, is responsible for enforcing all environmental laws, guidelines, policies, standards and regulations in Nigeria, as well as enforcing compliance with provisions of international agreements, protocols, conventions and treaties on the environment to which Nigeria is a signatory.

On the other hand, the Standards Organisation of Nigeria (SON) is the apex standardization body tasked with the regulatory responsibility of designing, establishing, approving and declaring standards in Nigeria (SON Act, 2015). In 2015, the SON through its technical committee (Paints and Allied Products, SON-TC 034) has set a standard (under its Mandatory Conformity Assessment Programme – MANCAP, and SON Conformity Assessment Programme – SON-CAP) for lead in paints at maximum level of 90 ppm, but the document is still waiting SON Council’s final approval before it can be officially gazetted. However, the Nigerian Industrial Standard (NIS) certification for the paint products remain largely a voluntary standard, and as such, may not be able to adequately regulate lead in paint conformance and compliance in Nigeria.

The National Agency for Food and Drug Administration Control (NAFDAC) and the Consumer Protection Council (CPC) are federal government agencies that exercise responsibility over the paint industry. The NAFDAC Act of 1993 mandates it to regulate and control the importation, exportation, manufacture, advertisement, distribution, sale and use of food, drugs, cosmetics, medical devices, bottled water and chemicals. Through this law, NAFDAC is involved in regulating the importation of some raw materials used by the paint industry. On the other hand, the CPC Act of 1992 authorizes the CPC to eliminate hazardous products from the market, provide speedy redress to consumer complaints, undertake campaigns that will lead to increased consumer awareness, and ensure that consumer interests receive due consideration at the appropriate forum. The law also encourages trade, industry and professional associations to develop and implement various quality standards designed to safeguard the interests of consumers.

## 2. MATERIALS AND METHODS

From July to August 2016, 54 cans of solvent-based paint intended for home use were purchased by SRADev Nigeria from various stores (Ikeja, Mushin, Agege, Bariga, Apapa, Coconut retail and wholesale markets) in Lagos, Nigeria. The paints represented 18 different brands produced by 16 manufacturers.

In most cases, one white paint and one or more bright-colored paint such as red or yellow were selected. Excluded were automotive and industrial paints that are not typically used for domestic housing applications.

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 “sunflower.” For all colored 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 the SRADev Nigeria office 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, labelled wood pieces using different unused, single-use paintbrushes by a researcher of SRADev Nigeria as shown in Figures 2 and 3.

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 (Figure 3). After drying, the painted wood pieces were placed in individually labelled, resealable plastic bags (Figure 4) and shipped for analysis (Figure 5) 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.



*Figure 2. Sample preparation by SRADev Nigeria team.*



*Figure 3. Prepared samples for drying.*



*Figure 4. Inspection of samples by an official of the Ministry of Environment.*



*Figure 5. Samples ready for dispatch after inspection by Fed. Min. of Environment official (Engr. A. Oyewole).*

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.

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.<sup>[16]</sup>

# 3. RESULTS

## 3.1 SUMMARY OF RESULTS

This study shows that:

40 out of 54 of the analyzed solvent-based paints (74 percent of paints) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm), dry weight. In addition, 29 paints (54 percent of paints) contained dangerously high lead concentrations above 10,000 ppm.

16 out of 18 analyzed brands (89 percent of paint brands) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. The same number of brands sold at least one lead paint with dangerously high lead concentrations above 10,000 ppm.

31 out of 36 bright-colored paints (86 percent of bright-colored paints) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm), dry weight. Yellow paints were the most hazardous with 16 out of 18 paints (89 percent of yellow paints) containing total lead concentrations at or above 10,000 ppm; 12 out of 18 red paints (67 percent of red paints) and 1 white paint (6 percent of white paints) also contained dangerously high lead concentrations at or above 10,000 ppm.

The highest lead concentration detected was 160,000 ppm in a yellow Finecoat Paint sold for home use.

Only 3 out of 54 paints (6 percent of paints) provided information about lead on their labels and most paints carried little information about ingredients. Most paints were merely labeled as “solvents, pigments and resin,” with no further details on the type of solvents and pigments (organic or inorganic) provided. Most warning symbols on the paint cans indicated the flammability of the paints, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.



### 3.2 LEAD CONTENT ANALYSIS

*40 out of 54 of the analyzed solvent-based paints (74 percent of paints) were lead paints, i.e., contained a lead concentration above 90 ppm—29 of these contained dangerously high lead concentrations above 10,000 ppm (54 percent of paints).*

A yellow color of Finecoat Paint contained the highest concentration of lead at 160,000 ppm, while the lowest concentration of lead less than 60 ppm was detected in 10 paints from the following brands: Hammerite (red, yellow, white); Honey Paint (white); President Paint (white); Prestige Paint (white); Princess Paint (white); Sandtex (white); So-fine (white); and Super Star Gloss (white).

The eleven solvent-based paints with the highest amounts of lead are summarized in Table 2.

**TABLE 2.** TOP 11 SOLVENT-BASED PAINTS WITH THE HIGHEST LEAD CONTENT.

Rank	Sample No.	Brand	Manufacturer	Color	Lead Content (ppm)
1	NIG-43	Finecoat Paint	Chemstar Paints Industries (Nigeria) Ltd	yellow	160,000
2	NIG-38	President Paint	President Paint Nigeria Ltd	yellow	150,000
3	NIG-08	Prestige Paint	Prestige Paint Nigeria Ltd	yellow	110,000
4	NIG-26	Happy Home Paint	Happy Home Paints and Chemicals	white	80,000
5	NIG-31	Value Paint	Gold Edge Industries Nigeria Ltd	yellow	72,000
6	NIG-48	Divine Paint	ROACI Nigeria Ltd	yellow	68,000
7	NIG-24	Silka Paint	Silka Paints Nigeria Ltd	yellow	68,000
8	NIG-12	Precious Paint	Precious Paints Nigeria Ltd	yellow	67,000
9	NIG-50	Sandtex Paint	Portland Paints and Products Nigeria Plc	yellow	56,000
10	NIG-52	Meyer Paint	DN Meyer Plc	yellow	53,000
11	NIG-16	Super Star Gloss Paint	Berger Paints Nigeria Plc	red	53,000

### 3.3 PAINT BRAND ANALYSIS

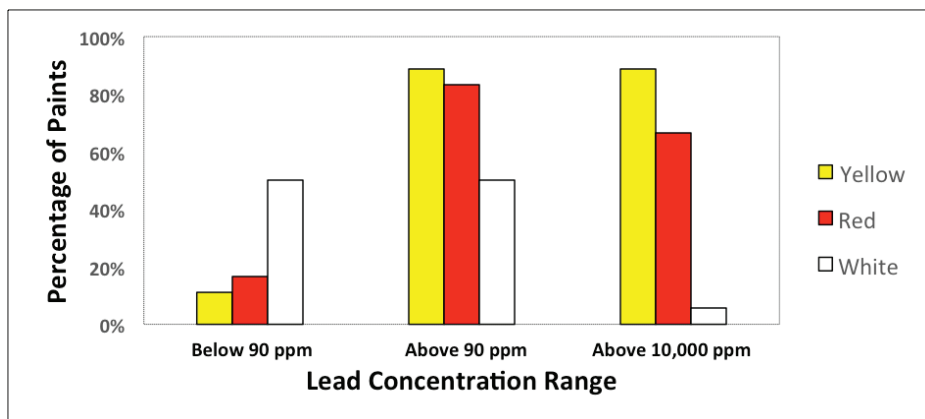
***16 out of 18 analyzed brands (89 percent of paint brands) sold at least one paint with dangerously high lead concentration above 10,000 ppm.***

Among solvent-based decorative paints, a yellow Finecoat Paint contained the highest concentration of lead at 160,000 ppm. On the other hand, at least one paint from each of the following brands contained lead below 90 ppm: Hammerite (red, white, yellow); Honey Paint (white); President Paint (white); Prestige Paint (white); Princess Paint (white); Sandtex Paint (red, white); Sofine Paint (red, white, yellow); Super Star Gloss Paint (white); and Value Paint (white). Apart from Hammerite, which is an imported brand, all other brands are locally made paints. This indicates that the technology to produce paint without added lead exists in Nigeria.

### 3.4 PAINT COLOR ANALYSIS

***31 out of 36 bright-colored paints (86 percent of bright-colored paints) such as yellow and red contained lead concentrations above 90 ppm, 28 paints of which contained dangerously high lead concentrations at or above 10,000 ppm (75 percent of bright-colored paints).***

This study included 18 yellow paints, 18 red paints and 18 white paints. Yellow and red paints contained the highest lead concentrations. 16 out of 18 yellow paints (89 percent of yellow paints) contained lead concentrations above 90 ppm, the same number of which exceeded more than 10,000 ppm of lead. The distribution of lead concentrations in different colors is shown in Figure 6.



***Figure 6. Distribution of Lead Concentrations in Solvent-Based Household Paints by Color.***

### 3.5 LABELING

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

Only 3 out of 54 paints (6 percent of paints) provided information about lead on their labels, which indicates “Special precaution should be taken while applying pre1960 paints as they may contain lead.” All three paints from the imported Hammerite brand had lead content below 60 ppm. Most paint can labels carried little information about any ingredients. Most paints were merely labeled as “solvents, pigments and resin,” with no further details on the type of solvents and pigments (organic or inorganic) provided on paint can labels. Manufacturing dates or batch numbers were included on the labels of 35 out of 54 paints (65 percent of paints) included in this study. Most warning symbols on the paint cans indicated the flammability of the paints, but no precautionary warnings on the effects of lead dust to children and pregnant women were provided.

### 3.6 COMPARISON WITH RESULTS FROM AN EARLIER STUDY

Lead levels in this study are consistent with the results of a similar paint study conducted by SRADev Nigeria in 2009. In that study, 23 solvent-based paints purchased in Lagos, Nigeria were sampled and analyzed. None of the earlier paints contained less than 90 ppm lead compared to 26 percent in the current study. Similarly, a somewhat higher percentage of the paints in the former study (65 percent) contained more than 10,000 ppm lead compared to 54 percent in the current study.

**TABLE 3.** COMPARISON OF LEAD CONCENTRATION IN NEW SOLVENT-BASED PAINTS FROM CURRENT STUDY WITH EARLIER STUDY.

	<b>Current Study</b>	<b>Previous Study (2009)</b>
Number of Paints	54	23
Percentage of paints with lead $\geq$ 90 ppm (number of paints)	74 (40)	100 (23)
Percentage of paints with lead $\geq$ 10,000 ppm (number of paints)	54 (29)	65 (15)
Maximum Concentration, ppm	160,000	130,000

## 4. CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that solvent-based paints for home use with high concentrations of lead are widely available in Nigeria since the paints sampled for this study are brands commonly sold in retail stores all over Nigeria. However, the fact that 14 out of 54 paints (26 percent of paints) contained lead concentrations below 90 ppm indicates that the technology to produce paints without added lead exists in Nigeria. 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 paints with total lead concentrations greater than 90 ppm.

To address the problem of lead in paint, SRADev Nigeria and IPEN propose the following recommendations:

**For the Federal Ministry of Environment**, in collaboration with the Standards Organisation of Nigeria, to immediately draft a regulation that will ban the manufacture, import, export, distribution, sale and use of lead paints, i.e., paints that contain total lead concentrations exceeding 90 ppm, the most restrictive standard in the world. They should also require paint companies to display sufficient information indicating toxic content on paint can labels and provide a warning on possible lead dust hazards when disturbing painted surfaces. Section 61(1D) of the Nigerian Trademark Act of 1990 states that any person who makes a representation to the effect that the registration of a trade mark gives an exclusive right to the use thereof in any circumstances in which, having regard to limitations entered on the register, the registration does not give that right, shall be liable on summary conviction to a fine not exceeding two hundred naira.<sup>[17]</sup>

**For paint companies** that still produce lead paints to expeditiously stop the use of leaded paint ingredients in paint formulations. 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.

**For paint consumers** to demand paints with no added lead from paint manufacturers, as well as full disclosure of a paint product's lead 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.

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

**For all stakeholders** to come together and unite in promoting a strong policy that will eliminate lead paint in Nigeria.

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# APPENDIX

**TABLE 4.** SOLVENT-BASED PAINTS FOR HOME USE INCLUDED IN THE STUDY.

Sample No.	Brand	Color	Volume (L)	Price (₦)	Date of Manufacture (d/m/y)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
NIG-01	City Paint	red	4	3100	None	None	31/08/2016	No
NIG-02	City Paint	yellow	4	3100	None	None	31/08/2016	No
NIG-03	City Paint	white	4	3100	None	None	31/08/2016	No
NIG-04	Honey Paint	white	4	3500	None	YSR/07/16/2598	29/08/2016	No
NIG-05	Honey Paint	yellow	4	3500	None	YSR/12/13/4394	29/08/2016	No
NIG-06	Honey Paint	red	4	3500	None	YSR/07/16/2659	29/08/2016	No
NIG-07	Prestige Paint	white	4	3500	None	P0170/260715	15/08/2016	No
NIG-08	Prestige Paint	yellow	4	3500	None	None	15/08/2016	No
NIG-09	Prestige Paint	red	4	3500	None	P0072B:30/03/16	15/08/2016	No
NIG-10	Precious Paint	white	4	3000	None	P20/230716	15/08/2016	No
NIG-11	Precious Paint	red	4	3000	None	P32/270716	15/08/2016	No
NIG-12	Precious Paint	yellow	4	3000	None	P28/220716	15/08/2016	No
NIG-13	Princess Paint	yellow	4	3000	None	YSR/12/15/4779	9/7/2016	No
NIG-14	Princess Paint	red	4	3000	None	YSR/05/16/1882	9/7/2016	No
NIG-15	Princess Paint	white	4	3000	None	YSR/06/16/2380	15/08/2016	No
NIG-16	Super Star Gloss Paint	red	4	7000	None	1508080	12/8/2016	<a href="http://www.bergerpaintsnig.com/">http://www.bergerpaintsnig.com/</a>
NIG-17	Super Star Gloss Paint	white	4	4700	None	1605165	12/8/2016	<a href="http://www.bergerpaintsnig.com/">http://www.bergerpaintsnig.com/</a>
NIG-18	Super Star Gloss Paint	yellow	4	5500	None	1604023	12/8/2016	<a href="http://www.bergerpaintsnig.com/">http://www.bergerpaintsnig.com/</a>
NIG-19	Hammerite	red	0.75	2500	23/09/2010	5011867009322	12/8/2016	No
NIG-20	Hammerite	white	2.5	6700	2014	5011867202044	12/8/2016	No

Sample No.	Brand	Color	Volume (L)	Price (₹)	Date of Manufacture (d/m/y)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
NIG-21	Hammerite	yellow	2.5	6700	23/09/2010	50118672222042	12/8/2016	No
NIG-22	Silka Paint	red	4	5500	None	1201012	29/08/2016	No
NIG-23	Silka Paint	white	4	5500	None	1605601	29/08/2016	No
NIG-24	Silka Paint	yellow	4	5500	None	1401711	29/08/2016	No
NIG-25	Happy Home Paint	red	1	1200	None	None	8/7/2016	No
NIG-26	Happy Home Paint	white	1	1200	None	None	8/7/2016	No
NIG-27	Happy Home Paint	yellow	1	1200	None	None	8/7/2016	No
NIG-28	So-fine Paint	white	1	800	None	None	8/7/2016	No
NIG-29	So-fine Paint	red	1	800	None	None	8/7/2016	No
NIG-30	So-fine Paint	yellow	1	800	None	None	8/7/2016	No
NIG-31	Value Paint	yellow	4	3300	None	DNFT 7908060516	9/7/2016	No
NIG-32	Value Paint	white	4	3300	None	DIFT8714210616	9/7/2016	No
NIG-33	Value Paint	red	4	3300	None	DDFT1255010416	9/7/2016	No
NIG-34	Wall Care Paint	yellow	4	3300	None	None	9/7/2016	No
NIG-35	Wall Care Paint	white	4	3300	None	None	9/7/2016	No
NIG-36	Wall Care Paint	red	4	3300	None	None	9/7/2016	No
NIG-37	President Paint	white	4	5600	None	None	8/7/2016	No
NIG-38	President Paint	yellow	4	5600	None	None	8/7/2016	No
NIG-39	President Paint	red	4	5600	None	None	8/7/2016	No
NIG-40	Eagle Paint	yellow	4	5600	None	BN-31916914 121638271213	8/7/2016	No
NIG-41	Eagle Paint	red	4	5600	None	BN-31916914 121638271213	8/7/2016	No
NIG-42	Eagle Paint	white	4	5600	None	BN-31916914 121638271213	8/7/2016	No



Sample No.	Brand	Color	Volume (L)	Price (₦)	Date of Manufacture (d/m/y)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
NIG-43	Finecoat Paint	yellow	4	5600	None	033925NL	8/7/2016	No
NIG-44	Finecoat Paint	white	4	5600	None	033353NL	8/7/2016	No
NIG-45	Finecoat Paint	red	4	5600	None	036913NL	8/7/2016	No
NIG-46	Divine Paint	red	4	2000	None	None	8/7/2016	No
NIG-47	Divine Paint	white	4	2000	None	None	8/7/2016	No
NIG-48	Divine Paint	yellow	4	2000	None	None	8/7/2016	No
NIG-49	Sandtex Paint	red	4	4800	None	13/C/15/GF/05	8/7/2016	No
NIG-50	Sandtex Paint	yellow	4	4800	None	6153400205019	8/7/2016	No
NIG-51	Sandtex Paint	white	4	4800	None	10/L/14/IG/04	8/7/2016	No
NIG-52	Meyer Paint	yellow	4	4000	None	BN1605187	8/7/2016	No
NIG-53	Meyer Paint	red	4	4000	None	BN1603530	8/7/2016	No
NIG-54	Meyer Paint	white	4	4000	None	BN1605078	8/7/2016	No

**TABLE 5.** 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?
NIG-01	City Paint	red	4,900	Nigeria	Nigeria	No
NIG-02	City Paint	yellow	34,000	Nigeria	Nigeria	No
NIG-03	City Paint	white	2,500	Nigeria	Nigeria	No
NIG-04	Honey Paint	white	Below 60	Nigeria	Nigeria	No
NIG-05	Honey Paint	yellow	50,000	Nigeria	Nigeria	No
NIG-06	Honey Paint	red	33,000	Nigeria	Nigeria	No
NIG-07	Prestige Paint	white	Below 60	Nigeria	Nigeria	No
NIG-08	Prestige Paint	yellow	110,000	Nigeria	Nigeria	No
NIG-09	Prestige Paint	red	23,000	Nigeria	Nigeria	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?
NIG-10	Precious Paint	white	3,200	Nigeria	Nigeria	No
NIG-11	Precious Paint	red	14,000	Nigeria	Nigeria	No
NIG-12	Precious Paint	yellow	67,000	Nigeria	Nigeria	No
NIG-13	Princess Paint	yellow	40,000	Nigeria	Nigeria	No
NIG-14	Princess Paint	red	27,000	Nigeria	Nigeria	No
NIG-15	Princess Paint	white	Below 60	Nigeria	Nigeria	No
NIG-16	Super Star Gloss Paint	red	53,000	Nigeria	Nigeria	No
NIG-17	Super Star Gloss Paint	white	Below 60	Nigeria	Nigeria	No
NIG-18	Super Star Gloss Paint	yellow	26,000	Nigeria	Nigeria	No
NIG-19	Hammerite	red	Below 60	United Kingdom	European Union	Yes. "Special precaution should be taken while applying pre1960 paints as they may contain lead."
NIG-20	Hammerite	white	Below 60	United Kingdom	European Union	Yes. "Special precaution should be taken while applying pre1960 paints as they may contain lead."
NIG-21	Hammerite	yellow	Below 60	United Kingdom	European Union	Yes. "Special precaution should be taken while applying pre1960 paints as they may contain lead."
NIG-22	Silka Paint	red	10,000	Nigeria	Nigeria	No
NIG-23	Silka Paint	white	1,200	Nigeria	Nigeria	No
NIG-24	Silka Paint	yellow	68,000	Nigeria	Nigeria	No
NIG-25	Happy Home Paint	red	8,100	Nigeria	Nigeria	No

<b>Sample No.</b>	<b>Brand</b>	<b>Color</b>	<b>Lead Content, Dry Weight (ppm)</b>	<b>Country of Brand Headquarters</b>	<b>Country of Manufacture</b>	<b>Is there information on can about lead content of paint?</b>
NIG-26	Happy Home Paint	white	80,000	Nigeria	Nigeria	No
NIG-27	Happy Home Paint	yellow	24000	Nigeria	Nigeria	No
NIG-28	So-fine Paint	white	Below 60	Nigeria	Nigeria	No
NIG-29	So-fine Paint	red	Below 70	Nigeria	Nigeria	No
NIG-30	So-fine Paint	yellow	Below 70	Nigeria	Nigeria	No
NIG-31	Value Paint	yellow	72,000	Nigeria	Nigeria	No
NIG-32	Value Paint	white	Below 70	Nigeria	Nigeria	No
NIG-33	Value Paint	red	24,000	Nigeria	Nigeria	No
NIG-34	Wall Care Paint	yellow	10,000	Nigeria	Nigeria	No
NIG-35	Wall Care Paint	white	3,000	Nigeria	Nigeria	No
NIG-36	Wall Care Paint	red	18,000	Nigeria	Nigeria	No
NIG-37	President Paint	white	Below 60	Nigeria	Nigeria	No
NIG-38	President Paint	yellow	150,000	Nigeria	Nigeria	No
NIG-39	President Paint	red	38,000	Nigeria	Nigeria	No
NIG-40	Eagle Paint	yellow	37,000	Nigeria	Nigeria	No
NIG-41	Eagle Paint	red	18,000	Nigeria	Nigeria	No
NIG-42	Eagle Paint	white	3,100	Nigeria	Nigeria	No
NIG-43	Finecoat Paint	yellow	160,000	Nigeria	Nigeria	No
NIG-44	Finecoat Paint	white	2,700	Nigeria	Nigeria	No
NIG-45	Finecoat Paint	red	32,000	Nigeria	Nigeria	No
NIG-46	Divine Paint	red	16,000	Nigeria	Nigeria	No
NIG-47	Divine Paint	white	260	Nigeria	Nigeria	No
NIG-48	Divine Paint	yellow	68,000	Nigeria	Nigeria	No
NIG-49	Sandtex Paint	red	60	Nigeria	Nigeria	No
NIG-50	Sandtex Paint	yellow	56,000	Nigeria	Nigeria	No
NIG-51	Sandtex Paint	white	Below 60	Nigeria	Nigeria	No
NIG-52	Meyer Paint	yellow	53,000	Nigeria	Nigeria	No

<b>Sample No.</b>	<b>Brand</b>	<b>Color</b>	<b>Lead Content, Dry Weight (ppm)</b>	<b>Country of Brand Headquarters</b>	<b>Country of Manufacture</b>	<b>Is there information on can about lead content of paint?</b>
NIG-53	Meyer Paint	red	5,000	Nigeria	Nigeria	No
NIG-54	Meyer Paint	white	2,100	Nigeria	Nigeria	No

**TABLE 6.** DISTRIBUTION OF LEAD CONCENTRATION BY BRAND.

<b>Brand</b>	<b>No. of Samples</b>	<b>No. of Samples Above 90 ppm</b>	<b>No. of Samples Above 10,000 ppm</b>	<b>Minimum Lead Content (ppm)</b>	<b>Maximum Lead Content (ppm)</b>
City Paint	3	3	1	2,500	34,000
Honey Paint	3	2	2	< 60	50,000
Prestige Paint	3	2	2	< 60	110,000
Precious Paint	3	3	2	3,200	67,000
Princess Paint	3	2	2	< 60	40,000
Super Star Gloss Paint	3	2	2	< 60	53,000
Hammerite	3	0	0	< 60	< 60
Silka Paint	3	3	2	1,200	68,000
Happy Home Paint	3	3	2	8,100	80,000
So-fine Paint	3	0	0	< 60	< 70
Value Paint	3	2	2	< 70	72,000
Wall Care Paint	3	3	2	3,000	18,000
President Paint	3	2	2	< 60	150,000
Eagle Paint	3	3	2	3,100	37,000
Finecoat Paint	3	3	2	2,700	160,000
Divine Paint	3	3	2	260	68,000
Sandtex Paint	3	1	1	< 60	56,000
Meyer Paint	3	3	1	2,100	53,000

**TABLE 7.** DISTRIBUTION OF LEAD CONCENTRATION BY COLOR.

<b>Color</b>	<b>No. of Samples</b>	<b>No. of Samples Above 90 ppm</b>	<b>No. of Samples Above 10,000 ppm</b>	<b>Minimum Lead Content (ppm)</b>	<b>Maximum Lead Content (ppm)</b>
White	18	9	1	< 60	80,000
Yellow	18	16	16	< 60	160,000
Red	18	15	12	< 60	53,000





[www.ipen.org](http://www.ipen.org)

[ipen@ipen.org](mailto:ipen@ipen.org)

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