IRAQ

LEAD IN SOLVENT-BASED PAINTS FOR HOUSEHOLD USE IN IRAQ

October 2018

Together To Protect Human & The Environment
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NATIONAL REPORT

LEAD IN SOLVENT-BASED PAINTS FOR HOUSEHOLD USE IN IRAQ

October 2018

ACKNOWLEDGMENTS

We take this opportunity to thank all those who were instrumental in compiling and shaping this paint study and had an active role in collecting data and information from governmental agencies (Ministry of Health and Environment) and paint companies, as well as the technical team who worked on the preparation of this study on the lead content of paints manufactured in and imported into Iraq.

The analytical study providing data to this report was undertaken as part of IPEN´s Global Lead Paint Elimination Campaign. It was conducted in Iraq by Together to Protect Human & Environment Association (Together), in cooperation with the Ministry of Health and Environment, and in partnership with IPEN, and funded by the New York Community Trust (NYCT) and the Swedish Government.

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 Together to Protect Human & Environment Association. 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 more than 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 Iraq. 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 Iraq. Finally, it proposes action steps by different stakeholders to protect children and others from lead paint.

This study was conducted by Together in cooperation with the Ministry of Health and Environment and in partnership with IPEN.

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

Together is a non-governmental organization working all over Iraq, focusing on building peaceful society and protecting environment through improving legislation and changing behaviors of individuals and the relevant laws. Together is a member in many international networks such as IPEN, GEF-CSO Network, Housing & Land Rights Network/Habitat International Coalition, Earth Day Network, Community Anti-Drug Coalitions of America (CADCA), and Arab Network for Environment & Development. Together got funds from many International organizations (e.g., USAID, US EMBASSY, CIDA, CADCA, UNESCO, UNFPA, RI, USIP, FIDA, American University-Global Peace Center, and IPEN) to implement this study.

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 Iraq, there is currently no legally-binding regulation in place limiting the amount of lead in paint for household and decorative use. Instead, Iraq's Ministry of Health and Environment issued instructions based mainly on the Law of the Protection and Improvement of the Environment No. 27 (2009) and instructions No. 4 of 1989 Article II, which states that "all economic activities should try to replace hazardous chemicals with other materials less dangerous whenever possible with least amount."

From December 2017 to January 2018, Together purchased a total of 38 cans of solvent-based paint intended for home use from stores in Baghdad, Iraq. The paints represented 15 different brands produced by 11 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

Sixteen out of 38 analyzed solvent-based paints for home use (42 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, the Philippines, and the United States of America. Moreover, two paints (five percent of paints) contained dangerously high lead concentrations above 10,000 ppm. The highest lead concentration detected was 110,000 ppm in a yellow Al-Marjan Gloss Enamel Paint sold for home use.

On the other hand, 22 out of 38 solvent-based paints for home use (58 percent of paints) contained lead concentrations below 90 ppm, including some paints manufactured locally in Iraq.

Eleven out of 15 analyzed brands (73 percent of paint brands) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. Two out of 15 analyzed brands (13 percent of paint 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 12 yellow paints, two (17 percent of yellow paints) contained lead levels above 10,000 ppm.

In general, paint can labels did not carry meaningful information about lead content or the hazards of lead paint. Only five out of 38 paints (13 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 25 out of 38 paints (66 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.

CONCLUSIONS

This study demonstrates that solvent-based paints for home use with high concentrations of lead are widely available in Iraq since the paints included in this study are brands commonly sold in retail stores all over the country. However, the fact that 22 out of 38 paints (58 percent of paints) contained lead concentrations below 90 ppm, some of which were locally manufactured in Iraq, indicates that the technology to produce paints without added lead exists. 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, Together and IPEN propose the following recommendations:

Government and Governmental Agencies

The Ministry of Environment and Health 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 implement the instructions and standards in place and initiate compliance monitoring processes for manufactured and imported paints. 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.

The Iraqi Central Organization for Standardization and Quality Control (COSQC) should implement the Iraqi standards, especially the specifications on the lead content of paints, on all locally manufactured and imported paints, and monitor compliance by paint manufacturers and importers.

The Ministry of Industry/General Directorate for Industrial Development and the Iraqi Industrialists Union should prepare an awareness program for the local manufacturers in order to identify the hazards of lead in paints, and increase awareness about these hazards and the consequences of lead exposure.

The Ministry of Commerce and the Chambers of Commerce in Baghdad and the provinces should identify importers of paints and educate them about the

need to import paints that comply with Iraqi standards and relevant environmental and health requirements, and also tighten control procedures by requesting necessary documents to confirm that paints imported into the country do not contain added lead.

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.

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 Iraq.

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 Iraq is estimated at $7.57 billion, or 5.90 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 anticorrosive 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, for example, 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 IRAQ

There are about 20 companies that manufacture paints in Iraq. These companies differ in terms of manpower, technical capacity and share in the Iraqi market—where they can be classified according to the volume of sales and coverage in the Iraqi market.

Large Paint Companies

The products of these companies represent the highest market share in terms of quantity and sales volume in the Iraqi market, as well as the variety of paint and coating products they manufacture. These companies include:

- Modern Paint Company (Mixed Industrial Sector): This company was established in 1976 and started its actual production in 1981. The company has technical agreements with international companies such as ICI English Company and Shtolac—an Austrian company. The company produces all types of paints (alkyd paint, oil-based coating, epoxy enamel coating, enamel coating, anticorrosive coating, fast enamel, fast-dry enamel coating, and quick-dry enamel) and the company's production capacity is 14 million liters per year.
- Al-tabieaa Company for Paints and Coatings (Private Sector): The market share of this company in the Iraqi market is about 40 percent of the local production. Its annual sales volume is about 45 million dollars and its production capacity is 60 million liters per year. The company owns several factories in Iraq (Baghdad, Najaf, and Karbala) and Jordan (Amman). The company produces all kinds of paints such as alkyd paint, oil-based paint, enamel coating, anticorrosive paint, fast enamel, and quick-dry enamel coating.
- Asia Paint Company (Private Sector): This company is one of the largest companies in Iraq, which distributes its production in Baghdad and other provinces. Its factories are located in Baghdad and it produces many types of paints such as emulsion paint, vinyl silk paint, solvent-based paint, and red oxide paint.

- The Mas-Iraq Company for Paints (Private Sector): Also known as Iraqi Almas Company for Paints and Chemical Industries, this company started with a series of specialized shops selling water-based paints, oil-based paints, and insulating paints. It started the first integrated paints factory in southern Iraq and began production in 2012. It is the fourth company in Iraq in terms of sales in the local market. The company produces emulsion paint, vinyl silk paint, solvent-based paint, red oxide paint, and roof guard paint.

Medium and Small Companies

There are about 16 companies under this category, which mostly represent handicraft factories with relatively limited production and low market share. This is mainly due to the lack of production or low product quality and efficiency. These companies represent five percent of the domestic market share and produce 12 brands of solvent-based paint for household use.

Imported Paints

On the Iraqi market, there are 12 brands of solvent-based paints for home use from Tameer Company (manufactured in Jordan), six brands from Kale (manufactured in Turkey), four brands from Midoco (manufactured in Egypt), and three brands from Jotun (manufactured in UAE).

The Iraqi Framework for Eliminating Lead Paint

There is currently no legally-binding regulation on lead paint in Iraq. Instead, Iraq's Ministry of Environment and Health issued instructions based mainly on the Law of the Protection and Improvement of the Environment No. 27 (2009) and instructions No. 4 of 1989 Article II, which states that "all economic activities should try to replace hazardous chemicals with other materials less dangerous whenever possible with least amount."

The Ministry of Environment and Health also issued instructions for the importation of chemicals. It grants licenses for the importation of chemicals and requires importers to clarify how the chemicals will be used.

The Iraqi Central Organization for Standardization and Quality Control (COSQC), the main authorized office that oversee the standards and quality of locally manufactured and imported paints, has issued standards with 33 approved specifications for paints, including specifications that the total lead content in decorative solvent-based paints must not exceed 600 ppm. However, the scope of this standard does not include other types of paints such as water-

based paints, anticorrosive paints and other industrial paints. The standards' specifications are currently being updated in accordance with the work plan of the COSQC. Unfortunately, COSQC has yet to implement monitoring procedures regarding the lead content of manufactured and imported paints.

2. MATERIALS AND METHODS

From December 2017 to January 2018, 38 cans of solvent-based paint intended for home use were purchased by Together from various stores in Baghdad, Iraq. The paints represented 15 different brands produced by 11 manufacturers (four produced in Iraq and seven imported).

In most cases, one white paint and one or more bright-colored paint such as red or yellow were selected. Additionally, three anticorrosive paints for consumer use were also included in this study. The availability of these paints in retail establishments suggested that they were intended to be used within home environments. Excluded were automotive and industrial paints that are not typically used for domestic housing applications.

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 Together 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 Together as shown in Figure 1 below.

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

Figure 1. Sample preparation.

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 400 ppm) for some of the samples.

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.

3. RESULTS

3.1 SUMMARY OF RESULTS

This study shows that:

- Sixteen out of 38 analyzed solvent-based paints (42 percent of paints) were lead paints, i.e., they contained lead concentrations above 90 parts per million (ppm), dry weight. In addition, two paints (five percent of paints) contained dangerously high lead concentrations above 10,000 ppm.
- Eleven out of 15 analyzed brands (73 percent of paint brands) sold at least one lead paint, i.e., a paint with lead concentration above 90 ppm. Also, two out of 15 analyzed brands (13 percent of paint brands) sold at least one lead paint with dangerously high lead concentrations above 10,000 ppm.
- Fourteen out of 26 bright-colored paints (54 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 two out of 12 paints (17 percent of yellow paints) containing lead concentrations greater than 10,000 ppm.
- The highest lead concentration detected was 110,000 ppm in a yellow Al-Marjan Gloss Enamel Paint sold for home use.
- Only five out of 38 paints (13 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

Sixteen out of 38 analyzed solvent-based paints (42 percent of paints) were lead paints, i.e., contained a lead concentration above 90 ppm—two of these contained dangerously high lead concentrations above 10,000 ppm (five percent of paints).

A yellow, Al-Marjan Gloss Enamel Paint contained the highest concentration of lead at 110,000 ppm, while the lowest concentration of lead less than 60 ppm was detected in 12 paints from the following brands: Al-Marjan Gloss Enamel Paint (white); Betek Boya (white); Golden Paints-Hammer Finish

Paint (yellow); Jotun (red, white and yellow); Modern Paints-Hammer Finish Paint (white); National Paints (red, white and yellow); and Sentetik Boya (white and yellow).

The ten solvent-based paints with the highest amounts of lead are summarized in Table 1.

TABLE 1. TOP 10 SOLVENT-BASED PAINTS WITH THE HIGHEST LEAD CONTENT.

Rank	Sample No.	Brand	Manufacturer	Color	Lead Content (ppm)
1	IRQ-07	Al-Marjan Gloss Enamel Paint	Al-Tabieaa Company (Iraq)	yellow	110,000
2	IRQ-19	Almas Gloss Paint	Almas Company (Iraq)	yellow	36,000
3	IRQ-02	Modern Paints Alkyd Gloss Enamel A332	Modern Paint Industries Company (Iraq)	yellow	8,300
4	IRQ-37	Sentetik Aster Anticorrosive Paint	Kale Company (Turkey)	red	3,900
5	IRQ-20	Almas Gloss Paint	Almas Company (Iraq)	white	3,400
6	IRQ-32	2000 Hammer Finish Paint	Mido Company (Egypt)	red	2,500
7	IRQ-18	Almas Gloss Paint	Almas Company (Iraq)	red	1,600
8	IRQ-08	Al-Yaqout Anticorrosive Paint	Al-Tabieaa Company (Iraq)	red	1,400
9	IRQ-03	Modern Paints Alkyd Gloss Enamel A332	Modern Paint Industries Company (Iraq)	white	890
10	IRQ-01	Modern Paints Alkyd Gloss Enamel A332	Modern Paint Industries Company (Iraq)	red	790

3.3 PAINT BRAND ANALYSIS

Two out of 15 analyzed brands (13 percent of paint brands) sold at least one paint with dangerously high lead concentration above 10,000 ppm.

Among solvent-based decorative paints, Al-Marjan Gloss Enamel Paint (yellow) contained the highest concentration of lead at 110,000 ppm. On the other hand, at least one paint from each of the following brands contained lead below 90 ppm: 2000 Hammer Finish Paint (white and yellow); Al-Marjan Gloss Enamel Paint (red and white); Al-Marjan Hammer Finish Paint (white); Betek

Boya (white); Golden Paints-Hammer Finish Paints (white and yellow); Jotun (red, white and yellow); Modern Paints-Hammer Finish Paint (red, white and yellow); National Paints (red, white and yellow); Sentetik Boya (white and yellow); and Tameer Paints-Hammer Finish Paint (red, white and yellow). Aside from the Al-Marjan paints, all others were imported from Egypt, Jordan and Turkey. This indicates that the technology to produce paints without added lead exists in these countries.

Among the three anticorrosive paints, Sentetik Aster contained the highest concentration of lead at 3,900 ppm, followed by Al-Yaqout with 1,400 ppm, and Mido with 650 ppm.

3.4 PAINT COLOR ANALYSIS

Fourteen out of 26 bright-colored paints (54 percent of bright-colored paints) such as yellow and red contained lead concentrations above 90 ppm, two paints of which contained dangerously high lead concentrations above 10,000 ppm (eight percent of bright-colored paints).

This study included 14 red paints, 12 yellow paints and 12 white paints. Yellow paints contained the highest lead concentrations.

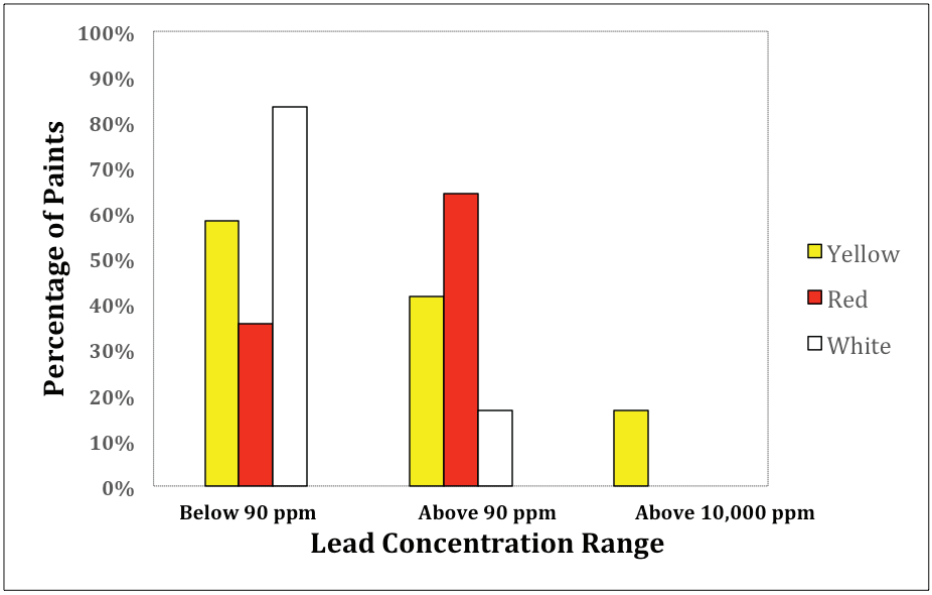

Figure 2. Distribution of Lead Concentrations in Solvent-Based Paints by Color.

Among bright-colored paints, five out of 12 yellow paints (42 percent of yellow paints) contained lead concentrations above 90 ppm, two paints of which exceeded more than 10,000 ppm of lead (17 percent of yellow paints). Of 14 red paints, nine (64 percent of red paints) contained lead concentrations above 90 ppm, none of which exceeded more than 10,000 ppm lead.

The distribution of lead concentrations in different colors is shown in Figure 2.

3.5 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 38 paints (13 percent of paints) provided information about lead on their labels and 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 25 out of 38 paints (66 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.

4. CONCLUSIONS AND RECOMMENDATIONS

This study demonstrates that solvent-based paints for home use with high concentrations of lead are widely available in Iraq since the paints sampled for this study are brands commonly sold in retail stores all over Iraq. However, the fact that 22 out of 38 paints (58 percent of paints) contained lead concentrations below 90 ppm, some of which were locally manufactured in Iraq, indicates that the technology to produce paints without added lead exists. 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, Together and IPEN propose the following recommendations:

For the Ministry of Health and Environment 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 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.

For the Iraqi Central Organization for Standardization and Quality Control (COSQC) to implement the Iraqi standards, especially the specifications on the lead content of paints, on all locally manufactured and imported paints, and monitor compliance by paint manufacturers and importers.

For the Ministry of Industry/General Directorate for Industrial Development and the Iraqi Industrialists Union to prepare an awareness program for the local manufacturers in order to identify the hazards of lead in paints, and increase awareness about these hazards and the consequences of lead exposure.

For the Ministry of Commerce and the Chambers of Commerce in Baghdad and the provinces to identify importers of paints and educate them about the need to import paints that comply with Iraqi standards and relevant environmental and health requirements, and also tighten control procedures

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

by requesting necessary documents to confirm that paints imported into the country do not contain added lead.

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. Paint companies must be required to display sufficient information indicating toxic content on paint can labels and provide a warning on possible lead dust hazards when disturbing painted surfaces.

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 the public 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 Iraq.

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APPENDIX

TABLE 2. SOLVENT-BASED PAINTS FOR HOME USE INCLUDED IN THE STUDY.

Sample No.	Brand	Color	Volume (L)	Price (Iraqi Dinar)	Date of Manufacture (d/m/y)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
IRQ-01	Modern Paints (Alkyd Gloss Enamel A332)	red	4	10	06/11/2016	3	30/12/2017	www.mpicoating.com
IRQ-02	Modern Paints (Alkyd Gloss Enamel A332)	yellow	4	10	22/12/2016	5	30/12/2017	www.mpicoating.com
IRQ-03	Modern Paints (Alkyd Gloss Enamel A332)	white	4	10	26/10/2017	15	30/12/2017	www.mpicoating.com
IRQ -05	Al-Marjan (Gloss Enamel Paint)	white	1	3	03/10/2017	21	30/12/2017	www.altabieaa.com
IRQ -06	Al-Marjan (Gloss Enamel Paint)	red	1	3	08/10/2017	8	30/12/2017	www.altabieaa.com
IRQ -07	Al-Marjan (Gloss Enamel Paint)	yellow	1	3	01/10/2017	6	30/12/2017	www.altabieaa.com
IRQ -08	Al-Yaqout	red	1	3	N/A	N/A	30/12/2017	www.altabieaa.com
IRQ -09	Al-Marjan (Hammer Finish Paint)	yellow	1	4	19/11/2017	60	30/12/2017	www.altabieaa.com
IRQ -10	Al-Marjan (Hammer Finish Paint)	white	1	4	03/11/2017	41	30/12/2017	www.altabieaa.com
IRQ -11	Al-Marjan (Hammer Finish Paint)	red	1	4	12/11/2017	55	30/12/2017	www.altabieaa.com
IRQ -12	Tameer Paints (Hammer Finish Paint)	white	4	15	23/08/2015	1508147	30/12/2017	www.tameerpaints.com
IRQ -13	Tameer Paints (Hammer Finish Paint)	red	4	15	11/01/2016	1601082	30/12/2017	www.tameerpaints.com
IRQ -14	Tameer Paints (Hammer Finish Paint)	yellow	4	15	25/02/2016	130642	30/12/2017	www.tameerpaints.com

Sample No.	Brand	Color	Volume (L)	Price (Iraqi Dinar)	Date of Manufacture (d/m/y)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
IRQ -15	Modern Paints (Hammer Finish Paint)	yellow	4	18	N/A	N/A	30/12/2017	No
IRQ -16	Modern Paints (Hammer Finish Paint)	white	4	18	N/A	N/A	30/12/2017	No
IRQ -17	Modern Paints (Hammer Finish Paint)	red	4	18	N/A	N/A	30/12/2017	No
IRQ -18	Almas Gloss Paint	red	1	3	01/03/2017	N/A	30/12/2017	almascomp@yahoo.com
IRQ -19	Almas Gloss Paint	yellow	1	3	10/10/2017	N/A	30/12/2017	almascomp@yahoo.com
IRQ -20	Almas Gloss Paint	white	1	3	01/10/2017	N/A	30/12/2017	almascomp@yahoo.com
IRQ -22	National Paints	white	4	10	01/06/2017	1147	30/12/2017	www.nationalpaints.com
IRQ -23	National Paints	red	4	10	01/11/2017	3010	30/12/2017	www.nationalpaints.com
IRQ -24	National Paints	yellow	4	10	06/05/2016	2206	30/12/2017	www.nationalpaints.com
IRQ -25	Golden Paints (Hammer Finish Paint)	white	1	15	N/A	N/A	30/12/2017	www.gcijo.com
IRQ -26	Golden Paints (Hammer Finish Paint)	red	1	15	01/05/2016	15053169	30/12/2017	www.gcijo.com
IRQ -27	Golden Paints (Hammer Finish Paint)	yellow	1	15	01/06/2016	16063980	30/12/2017	www.gcijo.com
IRQ -28	Jotun	white	4	25	21/03/2016	1137764	09/01/2018	www.jotun.com
IRQ -29	Jotun	yellow	4	25	21/06/2016	1137546	09/01/2018	www.jotun.com
IRQ -30	Jotun	red	4	25	08/10/2017	1509194	09/01/2018	www.jotun.com
IRQ -31	2000 (Hammer Finish Paint)	white	4	10	N/A	N/A	31/12/2017	www.midoco.com

Sample No.	Brand	Color	Volume (L)	Price (Iraqi Dinar)	Date of Manufacture (d/m/y)	Batch No.	Date of Purchase (d/m/y)	Is there website on label?
IRQ -32	2000 (Hammer Finish Paint)	red	4	10	N/A	N/A	31/12/2017	www.midoco.com
IRQ -33	2000 (Hammer Finish Paint)	yellow	4	10	N/A	N/A	31/12/2017	www.midoco.com
IRQ -34	Mido	red	4	6	22/02/2017	1192262	30/12/2017	www.midoco.com
IRQ -35	Betek Boya	yellow	2.5	15	N/A	N/A	09/01/2018	www.betekexport.com
IRQ -36	Betek Boya	white	2.5	15	N/A	N/A	09/01/2018	www.betekexport.com
IRQ -37	Sentetik Aster	red	4	14	21/09/2016	N/A	31/12/2017	www.kale.com.tr
IRQ -38	Sentetik Boya	white	4	15	N/A	N/A	30/12/2017	www.kale.com.tr
IRQ -39	Sentetik Boya	yellow	4	15	N/A	N/A	30/12/2017	www.kale.com.tr
IRQ -40	Sentetik Boya	red	4	15	N/A	N/A	30/12/2017	www.kale.com.tr

TABLE 3. 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?
IRQ-01	Modern Paints (Alkyd Gloss Enamel A332)	red	790	Iraq	Iraq	No
IRQ-02	Modern Paints (Alkyd Gloss Enamel A332)	yellow	8300	Iraq	Iraq	No
IRQ-03	Modern Paints (Alkyd Gloss Enamel A332)	white	890	Iraq	Iraq	No
IRQ -05	Al-Marjan (Gloss Enamel Paint)	white	Below 60	Iraq	Iraq	No
IRQ -06	Al-Marjan (Gloss Enamel Paint)	red	Below 100	Iraq	Iraq	No
IRQ -07	Al-Marjan (Gloss Enamel Paint)	yellow	110000	Iraq	Iraq	No
IRQ -08	Al-Yaqout	red	1400	Iraq	Iraq	No
IRQ -09	Al-Marjan (Hammer Finish Paint)	yellow	600	Iraq	Iraq	No
IRQ -10	Al-Marjan (Hammer Finish Paint)	white	Below 200	Iraq	Iraq	No
IRQ -11	Al-Marjan (Hammer Finish Paint)	red	120	Iraq	Iraq	No
IRQ -12	Tameer Paints (Hammer Finish Paint)	white	Below 200	Jordan	Jordan	No
IRQ -13	Tameer Paints (Hammer Finish Paint)	red	Below 200	Jordan	Jordan	No
IRQ -14	Tameer Paints (Hammer Finish Paint)	yellow	Below 200	Jordan	Jordan	No
IRQ -15	Modern Paints (Hammer Finish Paint)	yellow	Below 200	Jordan	Jordan	No
IRQ -16	Modern Paints (Hammer Finish Paint)	white	Below 60	Jordan	Jordan	No
IRQ -17	Modern Paints (Hammer Finish Paint)	red	Below 200	Jordan	Jordan	No
IRQ -18	Almas Gloss Paint	red	1600	Iraq	Iraq	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?
IRQ -19	Almas Gloss Paint	yellow	36000	Iraq	Iraq	No
IRQ -20	Almas Gloss Paint	white	3400	Iraq	Iraq	No
IRQ -22	National Paints	white	Below 60	Jordan	Jordan	No
IRQ -23	National Paints	red	Below 60	Jordan	Jordan	No
IRQ -24	National Paints	yellow	Below 60	Jordan	Jordan	No
IRQ -25	Golden Paints (Hammer Finish Paint)	white	Below 200	Jordan	Jordan	No
IRQ -26	Golden Paints (Hammer Finish Paint)	red	Below 400	Jordan	Jordan	No
IRQ -27	Golden Paints (Hammer Finish Paint)	yellow	Below 60	Jordan	Jordan	No
IRQ -28	Jotun	white	Below 60	Iraq	UAE	Yes. "Lead free"
IRQ -29	Jotun	yellow	Below 60	Iraq	UAE	Yes. "Lead free"
IRQ -30	Jotun	red	Below 60	Iraq	UAE	Yes. "Lead free"
IRQ -31	2000 (Hammer Finish Paint)	white	Below 100	Egypt	Egypt	No
IRQ -32	2000 (Hammer Finish Paint)	red	2500	Egypt	Egypt	No
IRQ -33	2000 (Hammer Finish Paint)	yellow	Below 200	Egypt	Egypt	No
IRQ -34	Mido	red	650	Egypt	Egypt	No
IRQ -35	Betek Boya	yellow	130	Turkey	Turkey	Yes. "Unleaded, < 57 ppm"
IRQ -36	Betek Boya	white	Below 60	Turkey	Turkey	Yes. "Unleaded, < 57 ppm"
IRQ -37	Sentetik Aster	red	3900	Turkey	Turkey	No
IRQ -38	Sentetik Boya	white	Below 60	Turkey	Turkey	No
IRQ -39	Sentetik Boya	yellow	Below 60	Turkey	Turkey	No
IRQ -40	Sentetik Boya	red	130	Turkey	Turkey	No

TABLE 4. 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)
Modern Paints (Alkyd Gloss Enamel A332)	3	3	0	790	8300
Al-Marjan (Gloss Enamel Paint)	3	1	1	< 60	110000
Al-Yaqout Anticorrosive Paint	1 (red)	1	0	1400	1400
Al-Marjan (Hammer Finish Paint)	3	2	0	< 200	600
Tameer Paints (Hammer Finish Paint)	3	0	0	< 200	< 200
Modern Paints (Hammer Finish Paint)	3	0	0	< 60	< 200
Almas Gloss Paint	3	3	1	1600	36000
National Paints	3	0	0	< 60	< 60
Golden Paints (Hammer Finish Paint)	3	1	0	< 60	< 400
Jotun	3	0	0	< 60	< 60
2000 (Hammer Finish Paint)	3	1	0	< 100	2500
Mido Anticorrosive Paint	1 (red)	1	0	650	650
Betek Boya	2	1	0	< 60	130
Sentetik Aster Anticorrosive Paint	1	1	0	3900	3900
Sentetik Boya	3	1	0	< 60	130

TABLE 5. 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)
Yellow	12	5	2	< 60	110000
Red	14	9	0	< 60	3900
White	12	2	0	< 60	3400

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