ELIMINATE LEAD PAINT: PROTECT CHILDREN'S HEALTH

African Lead Paint Elimination Project

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PREFACE

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

In 2007 and 2008, NGOs in the IPEN network collected and analyzed 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 had dangerously high lead content. In response, IPEN launched a worldwide lead paint elimination campaign. Since then, IPEN-affiliated NGOs and others have sampled and analyzed paints on the market in approximately 40 low- and middle-income countries.[1] Twelve of these studies were carried out with UNEP support.[2]

In 2009, new data documenting that lead paint is still widely sold in developing countries and countries with economies in transition contributed to a decision by the 2nd International Conference on Chemicals Management (ICCM2) to support global lead paint elimination. Following the ICCM2 decision, UNEP and WHO created the Global Alliance to Eliminate Lead Paint (GAELP), a framework within which they, governments, IPEN, national NGOs, paint industry representatives, and others collaborate to advance lead paint elimination objectives.

Today IPEN is comprised of 700 participating organizations in 116 countries, primarily developing countries and countries with economies in transition. IPEN brings together leading environmental and public health groups around the world to engage in international efforts to minimize and eliminate, when possible, hazardous toxic chemicals both internationally and within their own countries.

1 A list of these studies can be found on IPEN's web site at: http://ipen.org/projects/eliminating-lead-paint

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

INTRODUCTION

Lead is a toxic metal found in some paints.

Lead paint is produced when specific lead compounds are used to give paint its colour, reduce corrosion on metal surfaces, or help paint dry more quickly.[3] Lead compounds may also be present in a range of coatings, such as varnishes, lacquers, stains, enamels, glazes, or primers. Lead can also be found as a contaminant in other raw materials that are used to make paint and other products. As a result manufacturers must closely monitor overall lead content.[4]

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

Collection of data on the lead content of paints in developing countries and countries with economies in transition began as early as 1999 by a number of university-based teams and non-governmental organizations (NGOs). Many NGOs began sampling and analyzing paints for sale in their countries starting in 2007, after numerous high profile reports appeared in the international news media that raised concerns about toys coated with lead paint being manufactured in Asia for sale by major brands in North America and Western Europe.

In recent years, NGOs associated with IPEN, and others, have analyzed over 2,000 paint samples purchased on the market in at least 40 mostly

3 Lead compounds that are typically added to paint include, but are not limited to: lead carbonate (white lead), lead chromate, lead chromate oxide, lead chromate molybdate sulphate red, lead sulphochromate yellow, lead 2-ethylhexanoate, lead molybdate, lead naphthenate, lead nitrate, lead monoxide, lead oxide, lead octanoate, lead peroxide, lead sulphate, and tri lead-bis (carbonate)-dihydroxide.

4 Global Alliance to Eliminate Lead Paint (GAELP), *What is Lead Paint*, http://www.unep.org/chemicalsandwaste/Portals/9/Lead_Cadmium/images/LeadPaintFlyerJM121016_Web.pdf; See also GAELP Operational Framework, paragraphs 6 & 7: http://www.unep.org/chemicalsandwaste/Portals/9/Lead_Cadmium/images/GAELP_operational-framework-full-JM120725.pdf

low- and middle-income countries.[5] In twelve of these countries, these studies were supported by UNEP.[6]

In studied countries, where there was no national law or regulation in force to control the lead content of paints and where lead paint was not yet a public issue, the majority of the enamel decorative paints for sale on the market contained lead levels above 600 parts per million (ppm). Many of the paints contained more than 10,000 ppm lead, and would be prohibited for sale or use in virtually all highly industrial countries. In almost all cases, however, the consumer had no way to tell which of the enamel decorative paints for sale contained added lead and which did not.

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.
- "Enamel paint" refers to oil-based or solvent-based paints.
- "PPM" means parts per million total lead content by weight in a dried paint sample.

5 Annex A of this booklet lists paint studies in 40 countries, most of which were carried out by IPEN and partner NGOs. Studies in twelve countries were done in cooperation with UNEP. Dr. Scott Clark assisted IPEN with many of the studies.

6 Ibid.

LEAD EXPOSURE AND ITS HEALTH EFFECTS

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

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

Children playing indoors or outdoors get house dust or soil on their hands, and then ingest it through normal hand-to-mouth behavior. If the house dust or the soil is contaminated with lead, the children ingest lead. Hand-to-mouth behavior is especially prevalent in children aged six years and under, the age group most easily harmed by exposure to lead. A typical one- to six-year-old child ingests between 100 and 400 milligrams of house dust and soil each day.[7]

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

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

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

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

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

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

- A child's brain undergoes very rapid growth, development, and differentiation, and lead interferes with this process. For example, it has been shown that moderate lead exposure (5 to 40 μg/dL) during early childhood is connected to region-specific reductions in adult gray matter volume. Moderate blood levels have been linked to an increased likelihood of impaired cognition and executive function, impulsiveness, aggression, and delinquent behavior. The loss of gray matter in the brain constitutes a potential explanation for cognitive and behavioral problems associated with lead exposure.[12] Brain damage caused by chronic, low-level exposure to lead is irreversible and untreatable.
- Exposure to lead early in life can re-program genes, which can lead to altered gene expression and an associated increased risk of disease lat-

8 Ibid., page 12.
9 Ibid., page 48.
10 Verstraeten, S.V., et al, *Aluminium and lead: molecular mechanisms of brain toxicity*, (Archives of Toxicology 82:789–802. DOI 10.1007/s00204-008-0345-3, 2008)
11 World Health Organization, *Childhood Lead Poisoning*, http://www.who.int/ceh/publications/lead-guidance.pdf, 2010
12 Cecil, K.M., et al., *Decreased Brain Volume in Adults with Childhood Lead Exposure*, (PLOS Medicine (2008) 5(5): e112. DOI:10.1371/journal.pmed.0050112)

Lead Exposure Reduces Intelligence

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

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

er in life. For example, gene alterations caused by prenatal lead exposure have been implicated in the development of Alzheimer's disease.[13]

- Gastrointestinal absorption of lead is enhanced in childhood. Up to 50 percent of ingested lead is absorbed by children, as compared with 10 percent in adults. (Pregnant women may also absorb more ingested lead than other adults.)[14]

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

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

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

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

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

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

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

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

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

ECONOMIC IMPACTS OF LEAD PAINT EXPOSURE

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

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

- Africa: $134.7 billion of economic loss, or 4.03% of Gross Domestic Product (GDP)
- Latin America and the Caribbean: $142.3 billion of economic loss, or 2.04% of GDP
- Asia: $699.9 billion of economic loss, or 1.88% of GDP

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

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

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

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

SOURCES OF LEAD IN PAINT

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

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

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

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

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

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

ALTERNATIVES TO LEAD IN PAINT

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

If a case arises in which a paint product has been analyzed and found to contain somewhat more than 90 ppm lead, yet the paint manufacturer claims to have eliminated the use of all intentionally added lead compounds, the source of the lead might be significant lead contamination in one or more of the paint ingredients. Highly contaminated ingredients can be easily avoided by a paint manufacturer that uses appropriate quality control procedures and that informs its vendors paint ingredients with high lead contamination are not acceptable.

Decorative Paints

Highly industrial countries in North America, Western Europe, and elsewhere have strictly controlled the lead content of all decorative paints sold and used in their countries for decades. (They have also controlled the lead content of paints used on children's toys and for some other applications likely to contribute to childhood lead exposure.) Even in the absence of specific laws and regulations, some paint manufacturers in most low- and moderate income countries produce unleaded paints that compete well in the marketplace, and appropriate substitute ingredients are widely available.

While the obstacles associated with the elimination of lead-based ingredients in the manufacture of decorative paints appear to be minimal, there may be additional technical obstacles or costs associated with eliminating the use of lead compounds in some categories of industrial paints. For this and other reasons, when governments consider the adoption of legally binding laws, regulations, standards, and/or procedures to control the production, import, sale, and use of lead paints, priority might be given to controls addressing decorative paints and paints for other applications

most likely to contribute to childhood lead exposure. Nonetheless, the lead content of all paint categories should be controlled.

Industrial Paints

Lead paints used for certain industrial applications have a long history of contributing to occupational lead exposure in workers. In addition, there are cases where leaded industrial paints also contributed to lead exposure in children (for example, when lead industrial paints are inappropriately used for outdoor playground equipment or used on bridges and other structures near areas where children may play). Although highly industrial countries do not have a consistent history of strictly controlling the lead content of all industrial paints, this now appears to be changing.

Starting in May 2015, the European Union will strictly control the manufacture and import of lead chromate pigments, and their use in all categories of paints and coatings. This has led European pigment manufacturers to phase out production of lead-based pigments in Europe,[24] and will likely lead industrial paint manufacturers serving the European market to phase out the use of lead pigments in all their paint and coatings products.

Even though priority might be given to controls addressing decorative paints and paints for the other applications most likely to contribute to childhood lead exposure, leaded industrial paints also pose unnecessary hazards and should also be phased out as expeditiously as feasible.

24 Third party submission of information on alternatives for Applications for Authorisation by BASF to the European Chemicals Agency (ECHA): Consultation Number: 0012-01 to 0012-06 http://echa.europa.eu/documents/10162/18074545/a4a_comment_380_1_attachment_en.pdf

FRAMEWORK FOR ELIMINATING LEAD PAINT

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

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

International Framework for Lead Paint Elimination: Global Alliance to Eliminate Lead Paint (GAELP)

At the second session of the International Conference on Chemicals Management (ICCM), held in 2009, several chemical issues were identified by consensus to be international priority issues of concern. One of these was lead in paints, and there was a decision to establish it as an international emerging policy issue.[25] In response to the ICCM decision, the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) jointly initiated a global partnership to eliminate the use of lead compounds in paints in order to protect public health and the environment. This partnership is called the Global Alliance to Eliminate Lead Paint (GAELP).[26] GAELP's broad objective is to phase out the manufacture and sale of paints containing lead, and eventually to eliminate the risks from such paint.[27]

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

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

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

National Frameworks for the Elimination of Lead Paint

It is important for governments to address the problem of lead in paint by establishing a legal framework to control the manufacture, import, sale, and use of lead decorative paints and other paints likely to contribute to human lead exposure. Legal frameworks used for controlling lead paints will vary from country to country, but are best developed in collaboration with stakeholders such as government, industry, and civil society.

Virtually all highly industrial countries have laws or regulations that have been in force since the 1980's or before to control the lead content of decorative paints. In 2008, in response to growing concerns about childhood lead exposure and new evidence of low-dose impacts, a law was passed by the United States that revised the previous 600 ppm maximum limit for lead in decorative paints and established 90 ppm as the new limit.[28] This limit applies to paint and other similar surface coatings used on toys, other articles intended for use by children, and certain items of furniture. The law applies to paints used in residences, schools, hospitals, parks, playgrounds, public buildings, and other areas where consumers will have direct access to painted surfaces.[29] Canada has since set a similar limit, and in 2009, the European Union placed new, very strict controls on the production and use of lead pigments.[30] In Argentina, Uruguay, and some other countries, recent decrees with the force of law have established a maximum allowable lead concentration in enamel decorative paints of 600 ppm, and prohibit the production and import of paints with a lead concentration above this limit.[31]

In some countries, the environment ministry or the health ministry may have the authority to issue a regulation, a decree, or a control order that controls the lead content of paints. A number of countries, as part of their national Strategic Approach to International Chemicals Management (SAICM) implementation programs, are attempting to strengthen their national capabilities for sound chemicals management, including the promotion and adoption of enabling laws and the establishment of inter-ministerial committees to coordinate these national efforts. In some other countries, national standards agencies have the power, under certain

28 United States Consumer Products Safety Commission, *FAQs: Lead In Paint (And Other Surface Coatings)* (http://www.cpsc.gov/en/Business--Manufacturing/Business-Education/Lead/FAQs-Lead-In-Paint-And-Other-Surface-Coatings/

29 Ibid.

30 See European Chemicals Agency, Candidate List of Substances of Very High Concern for Authorisation: http://echa.europa.eu/candidate-list-table; For a short explanation see: FIRA; REACH Substance Sheet 4: http://www.fira.co.uk/document/reach-substance-sheet-4--lead-chromates.pdf

31 For Argentina, see: ARG/166/Add.3 at: http://www.puntofocal.gov.ar/formularios/registro_arg04.php; For Uruguay see: http://www.mvotma.gub.uy/images/Decreto%2069-011%20Diario%20Oficial.pdf

conditions, to establish legally binding national standards, such as the maximum permissible lead content of paint.

Reducing the adverse health effects from lead paints in order to protect the most vulnerable populations necessitates controlling exposures. National controls on the manufacture, import, sale, use, and export of lead paints are far more cost-effective in reducing exposure risks than any future remediation program. Legislation and/or regulation is needed to stop current practices and protect human health and the environment.[32]

Prior to developing or modifying legislation and/or regulatory requirements to limit the amount of lead in paint, a government should review its existing requirements and voluntary standards. The development of new legislation and/or regulations would only be needed if the existing laws, regulations, and enforcement programs are determined to be inadequate to protect public health.[33] Legal and regulatory frameworks should be adapted to the national legal framework, and be brought in line with legal and institutional infrastructures governing the placement of chemicals for its sound management.

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

- Prevention of the manufacture, import, use, and export of lead paint;
- Development of a system with effective means of enforcement and compliance;
- Establishment of institutional responsibilities and arrangements for management and enforcement of legislation and/or regulation.[34]

Monitoring and Compliance

While the establishment of a national law, regulation, decree, or binding standard to control the lead content of paint is very important, it is not, by itself, enough. It is also important to assign clear responsibilities for the various actions required by its provisions. It is necessary to build the oversight capacity of those agencies that have responsibilities assigned to them, and to provide sufficient resources for them to carry out their functions. Governments need to establish a monitoring program that includes regular inspections to ensure that paints are manufactured and marketed

32 Global Alliance for the Elimination of Lead Paint, *The Elements of a National Legal and Regulatory Framework for the Elimination of Lead in Decorative Paints*, http://www.unep.org/chemicalsandwaste/Portals/9/Lead_Cadmium/docs/GAELP/GAELP%20Documents/NRFflyer-.pdf

33 Ibid.

34 Ibid.

in conformity with legislation and regulation. Periodic sampling of paints is also needed to ensure their lead content meets prescribed standards.[35]

The elimination of lead paint may also be aided by voluntary schemes such as third-party paint certification and labeling programs. Under such programs, participating paint companies agree that they will not add lead compounds to their paints, and will only market products with lead levels below a specified limit (for example, 90 ppm). Participating companies also agree to place a certification label on their paints indicating that the paint does not contain added lead compounds. Consumer groups and others then work cooperatively with participating companies to encourage consumers to look for the label when selecting paints. Third party monitors have the paints analyzed on a regular basis to ensure compliance.

Third-party certification of paints safeguard against double standards from paint companies selling unleaded paints where the national law requires it and leaded paints where no regulations exists, as has been shown in a study from South Asia.[36]

35 Ibid.

36 Toxics Link, *Double Standard: Investigating Lead Content In Leading Enamel Paint Brands In South Asia* (http://toxicslink.org/docs/Double_Standard_Lead_Paint_29_June_2011.pdf)

LEAD PAINT IN CAMEROON, CÔTE D'IVOIRE, ETHIOPIA AND TANZANIA

In 2013, enamel decorative paints on the market in Côte d'Ivoire and Ethiopia were sampled and analyzed for their lead content as part of a UNEP/IPEN study.[37] Twenty paint samples were collected in Côte d'Ivoire by the NGO Jeunes Volontaires pour l'Environnement (JVE). Thirteen of the samples (65%) had lead concentrations greater than 600 ppm lead. Five samples (25%) had lead concentrations greater than 10,000 ppm lead.

Twenty-three paint samples were collected in Ethiopia by the NGO Pesticide Action Nexus Association (PAN). Nineteen of the samples (83%) had lead concentrations greater than 600 ppm lead. Five of the samples (22%) had lead concentrations greater than 10,000 ppm lead.

In 2011, enamel decorative paints on the market in Cameroon were sampled and analyzed for their lead content as part of a study by the Cameroonian NGO Centre de Recherche et d'Education pour le Développement (CREPD) in cooperation with the US-based NGO Occupational Knowledge International (OKI).[38] Sixty-one paint samples of 15 different brands of paints were purchased. Thirty-nine of the samples (64%) had lead concentrations greater than 600 ppm lead. Fifteen of the samples (25%) had lead concentrations greater than 10,000 ppm lead.

In 2009, paints on the market in Tanzania were sampled and analyzed for their lead content as part of a study by the NGO AGENDA for Environment and Responsible Development (AGENDA).[39] Twenty of the paints sampled were enamel paints. Nineteen of them (95%) had lead concentrations greater than 600 ppm lead. Five of them (25%) had lead concentrations greater than 10,000 ppm lead.

37 UNEP and IPEN; *Lead in Enamel Decorative Paints; National Paint Testing Results: A Nine Country Study, 2013*: http://www.unep.org/chemicalsandwaste/Portals/9/Mercury/Documents/publications/Lead_in_Enamel_decorative_paints.pdf

38 The Research and Education Centre for Development (CREPD); *Lead Concentrations in New Residential Paints in Cameroon*, 2011 http://www.okinternational.org/docs/Report%20on%20Paint%20Sample%20Analyses%20FINAL%20English.pdf

39 Toxics Link and IPEN; *Lead in New Decorative Paints*; 2009: http://ipen.org/sites/default/files/documents/global_paintstudy-en.pdf

CONCLUSIONS

Lead paint is a serious human health hazard, especially when the paint is used in applications likely to expose children to lead.

Decorative paints and paints for use on children's products can be easily produced without the use of lead pigments, lead driers, and lead anti-corrosive agents.

Manufacturers can reformulate their decorative paints to avoid the use of leaded ingredients without any significant sacrifice to the quality of the paint, and with very little, if any, increase in their total cost of production.

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

Regulatory Frameworks

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

In the design of the regulatory framework, consideration should be given to the inclusion of provisions for compliance, monitoring, and enforcement.

Public Awareness

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

surface for repainting; the need for training in lead-safe work practices for painters and others working on previously-painted surfaces; and the need for resources to conduct such training.

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

Voluntary Action and Labeling

In some countries, some paint manufacturers have acted voluntarily to eliminate lead compounds in the formulation of their paints. All paint manufacturers in countries that lack a well-enforced national lead paint control regime should be encouraged to act voluntarily to eliminate lead compounds in the formulation of their paints – particularly, their decorative paints and paints for other applications likely to contribute to lead exposure in children and others.

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

APPENDIX

AFRICAN LEAD PAINT STUDIES AND REPORTS[40]

Africa

Total number of paint samples analyzed: 450
Number of countries where paint studies have been conducted: 14

Country	Lead in New Decorative Paints[41]	Lead in Enamel Decorative Paints[42]	Other Published Studies
Tanzania	26		
South Africa	29		
Nigeria	30		25 Lead levels in new enamel household paints from Asia, Africa and South America[43]
Senegal	30		
Kenya			31 Lead in Kenyan Household Paint[44]
Cameroon			61 Lead Concentrations and Labeling of New Paint in Cameroon[45]
Uganda			50 Collection of Lead Based Paint Samples in Uganda[46]
Cote d'Ivoire		30	
Ethiopia		30	
Ghana		30	
Tunisia		30	
Egypt			20 Lead levels in new enamel household paints from Asia, Africa and South America[47]

40 For a complete list of published studies and reports analyzing lead in paint in 40 countries, visit http://ipen.org/projects/eliminating-lead-paint

Country	Lead in New Decorative Paints	Lead in Enamel Decorative Paints	Other Published Studies
Seychelles			28 Lead levels in new enamel household paints from Asia, Africa and South America[48]
Total number of paints	115	120	215

Footnotes

41 Toxics Link and IPEN, *Lead in New Decorative Paints*, 2009: http://ipen.org/sites/default/files/documents/global_paintstudy-en.pdf

42 UNEP and IPEN, *Lead in Enamel Decorative Paints; National Paint Testing Results: A Nine Country Study*, 2013: http://www.unep.org/chemicalsandwaste/Portals/9/Mercury/Documents/publications/Lead_in_Enamel_decorative_paints.pdf

46 Clark, C.S., Rampal, K.G., Thuppil, V., Roda, S.M., Succop, P., Menrath, W., Chen, C.K., Adebamowo, E.O., Agbede, O.A., Sridhar, M.K.C., Adebamowo, C.A., Zakaria, Y., El-Safty, A., Shinde, R. M., and Yu, J. (2009) *Lead levels in new enamel household paints from Asia, Africa and South America*, Environmental Research 109:930-936. (Includes data for China, India, Malaysia and Singapore presented in Clark et al (2006) Environmental Research 102:9-12.; and data for Nigeria presented in Adebamowo, Clark et al (2007) presented in Science of the Total Environment 388:116-120.)

43 Nganga C, Clark S, Weinberg J (2012), *Lead in Kenyan Household Paint*, September, 2012, iLima, Nairobi, Kenya, University of Cincinnati http://ipen.org/sites/default/files/documents/lead%20in%20kenyan%20household%20paint%20sept.%202012.pdf

44 P. Gottesfeld , G. Kuepouo , S. Tetsopgang & K. Durand (2013): *Lead Concentrations and Labeling of New Paint in Cameroon*, Journal of Occupational and Environmental Hygiene, 10:5, 243-249

45 UNETMAC and IPEN *Collection of Lead Based Paint Samples in Uganda*, 2010 http://ipen.org/documents/isip-report-collection-lead-based-paint-samples-uganda

47 Clark, C.S. et. al., Environmental Research, loc. cit.

48 Clark, C.S. et. al., Environmental Research, loc. cit.

GEF (**www.thegef.org**) is a partnership for international cooperation where 183 countries work together with international institutions, civil society organizations, and the private sector to address global environmental issues.

UNEP (**www.unep.org**) is the voice for the environment within the United Nations system. UNEP acts as a catalyst, advocate, educator, and facilitator to promote the wise use and sustainable development of the global environment.

IPEN (**www.ipen.org**) is an international NGO network with 700 participating organizations working in 116 countries to promote safe chemical policies and practices that protect human health and the environment.

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