

2021

STUDY OF LEAD IN SPRAY PAINTS, NEPAL

OCTOBER 2021



RAM CHARITRA SAH

**Every third (1 of 3) Spray
Paint you purchase is
likely to contain lead
concentration more than
the Government of Nepal
Lead Paint Standard limit
of 90 ppm.**



Center for Public Health and Environmental Development (CEPHED)
Kathmandu, Nepal



Study of Lead in Spray Paints, Nepal

Copyright: Center for Public Health and Environmental Development (CEPHED), 2021

The material in this publication may be reproduced in whole or in part and in any form for educational or non-profit uses without special permission from the copyright holder, provided acknowledgment of the source is made.

The publisher would appreciate receiving a copy of any publications which use this publication as a source.

Citation: Sah, Ram Charitra, Study of Lead in Spray Paints, Nepal, Center for Public Health and Environmental Development (CEPHED), October 2021

Published Date: October 2021

Center for Public Health and Environmental Development (CEPHED)

Kathmandu, Nepal
Phone/Fax: +977-01-5201786
Mobile: +977 9803047621
Website: www.cephed.org.np
Email: info@cephed.org.np

Study Team:

Ram Charitra Sah, Executive Director & Environment Scientist, CEPHED, Nepal, ramcharitra@gmail.com
Sachita Banmala, Program Officer, CEPHED, Nepal, sachita.banmala@gmail.com

Disclaimer: *While this publication has been produced with the assistance of the World Health Organization (WHO), Country Office for Nepal, the contents of the publication are the sole responsibility of the Center for Public Health and Environmental Development (CEPHED) and can in no way be taken to reflect the views of the WHO.*

ACKNOWLEDGEMENT

First of all, sincere thanks go to the World Health Organization (WHO), Country Office for Nepal for providing financial and technical support for this study. We highly acknowledge support and cooperation from Mr. Raja Ram Pote Shrestha, National Professional Officer (NPO) for his continuous technical guidance on the study and preparation of other activities planned under this project entitled "Celebration of ILPPW 2021, Nepal with compliance monitoring of Lead Paint Standard towards its effective implementation"

We express our gratitude to Dr. Sameer Kumar Adhikari, Chief, Multi-sector Coordination Section, MOHP for issuing a letter for support for this program, Sara Brosché, Ph.D., Science Advisor, Mr. Jeiel Guarino, Global Lead Paint Elimination Campaigner of IPEN and Ms Alka Dubey, IPEN South Asia Regional Hub Toxic Link, India for its counsel and guidance in the writing and review of this document. We also acknowledge the great support and cooperation of Mr. Shayam Kumar Shah, Chief Warden of Banke National Park, Mr. Krishna Dutta Bhatta, Divisional Forest Officer (DFO) of Dhangadhi, Rajendra Basukala, Chief, Environment Section, Ministry of Industry, Tourism, Forest and Environment (MOITFE), Karnali Province, Mr. Gunjan Gahatraj, Mr. Kapil Dhungana MOITFE of Gandaki Province, Mr. Ram Chandra Kandel, Secretary, MOITFE, Province No. 2. Mr. Ram Bichari Thakur, Joint Secretary, Mr. Bharat Pd. Shrestha and Mr. Nirpesh Awasthi of MOITFE, Sudur Paschim; Mr. Bikash Adhikari, Social Development Office of Dhankuta Municipality, Province No. 1, Mr. Prem Pariyar, Bharatpur and Mr. Yogendra Yadav, Assistant Professor, Institute of Forestry (IOF) Hetauda in fieldwork efforts while collecting the paints samples.

CEPHED also would like to acknowledge the Paint Industries and their dealers/retailers who keenly listen to our study teams while collecting sampling from different parts of Nepal. Our deep appreciation goes to the CEO of National Auto and Spray Udhyog, Hetauda, Nepal for sharing detailed information on the same.

This report presents the first publicly available data on the total lead concentrations of paints in aerosol cans, popularly referred to as spray paints, which are sold for consumer or general use by paint shops and various retail outlets in Nepal mostly imported ones and few from just only one Spray Paint Industry in Nepal. The report also recommends action steps by different stakeholders to protect children and other vulnerable groups lead exposure.

CEPHED highly acknowledge the laboratory personal's especially Mr. Sunil Babu Kahatri for timely completion of the lead testing and hard work of Ms. Deena Parjapati, Ms. Sachita Banmala, Ms. Archana Sah and Mr. Ujwal Sah for making this study success.

This study report was produced as part of the project funded by WHO and aimed to enhance effective implementation of lead paint standards through eliminating lead in paint and raise widespread awareness among business entrepreneurs, all three tiers of governments and consumers about the adverse human health impacts of lead-based enamel paints, particularly on the health of children under six years old.



Ram Charitra Sah

*Executive Director and Environment Scientist
CEPHED*

PREFACE

Lead paints for home use continue to be increasingly and widely produced, sold, and used in developing countries although most highly industrial countries banned lead paints for household use more than 40 years ago. CEPHED is participating Organization from Nepal to the Global Alliance to Eliminate Lead Paint (GAELP), a joint initiative of UNEP and WHO, to eliminate lead paint.

In the year 2020, the first-ever study of lead in SPRAY PAINTS has been carried out by the Eco Waste Coalition in the Philippines indicate the high lead exceeding their lead paint standard even in the spray paints mostly used in automobile and outdoor applications. This provides a clear indication of the needs of the conducting similar study in Nepal too and see the adherence status of lead paint standards enacted for all kinds of paints more than six year ago by the Government of Nepal.

This is the first-ever larger study of lead in spray paints carried out in Nepal by CEPHED with the support of WHO. Study includes 21 spray paints samples collected from different cities of Nepal of eight industries including only one known Nepalese Spray Paint industry named National Auto and Spray Udhog, Hetauda, Nepal.

This report entitled “Study of Lead in Spray Paints in Nepal, 2021” presents completely new and first-ever data on the status of total lead content of spray paints available on the different markets of Nepal after six years of lead paints standard became effective on 20th June 2015. 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 effectively implement the adopted lead paint standard and enforce further regulatory controls in all the provinces of Nepal. Finally, it proposes action steps by different stakeholders to protect children and others from lead paint as well as to protect the

environment as these spray paints are mostly used outdoors.

This Study of Lead in Spray Paints in Nepal, 2021 was conducted by the Center for Public Health and Environmental Development (CEPHED) in close coordination with the central focal Ministry of Forest and Environment (MOFE), Department of Environment (DoEnvt), Ministry of Industry, Commerce and Supplies (MOICS), Nepal Bureau of Standard and Metrology (NBSM), Ministry of Health and Populations (MOHP) as well as concerned Ministries of Industry, Tourism, Forest and Environment (MOITFE) of Nepal.

World Health Organization (WHO) is a specialized agency of the United Nations responsible for international public health. The WHO Constitution, which establishes the agency’s governing structure and principles, states its main objective as “the attainment by all peoples of the highest possible level of health”. It is headquartered in Geneva, Switzerland, working with 194 Member States across six regions and on the ground in 150+ locations, the WHO team works to improve everyone’s ability to enjoy good health and well-being worldwide(<https://www.who.int/about/>). This study has been undertaken in close coordination and cooperation with WHO Country Office for Nepal.

Center for Public Health and Environmental Development (CEPHED) is an environmental NGO established in the year 2004, by a group of activists and experienced people from the medical, environmental, and public health sectors. CEPHED’s focus is to serve Nepalese people and communities in the field of public health and the environment. CEPHED has adopted the vision of connecting people to science and technology for healthy living and environmental safety and providing access to new scientific knowledge, technology and safety measures from the environment and public health sectors through research, coordination, capacity building, and policy advocacy etc.,.



Ram Charitra Sah

*Executive Director and Environment Scientist
CEPHED*



TABLE OF CONTENT

ACKNOWLEDGEMENT	i
PREFACE	ii
ABBREVIATION & LEAD PAINT TERMINOLOGY	iv
EXECUTIVE SUMMARY	vi
1. BACKGROUND	1
1.1 Health and Economic Impacts of Lead Exposure	1
1.2 The Use of Lead in Paint	3
1.3 Spray Paint Market and Regulatory Framework in Nepal	3
1.4 Lead Paint Regulatory Framework	4
2. STUDY PROCEDURE	6
2.1 Objective of Study	6
2.2 Study area	6
2.3 Methodology	7
2.4 Lab test	7
3. RESULTS	9
3.1 Summary of Results	9
3.2 Industries and Brand wise lead concentration distribution	10
3.3 Lead concentration across different colors	11
3.4. Lead Concentrations in Labeled Spray paints	12
4. CONCLUSION & RECOMMENDATIONS	13
5. REFERENCES	15
6. APPENDICES	16

ABBREVIATION & LEAD PAINT TERMINOLOGY

AAS	Atomic Absorption Spectroscopy
ANROEV	Asian Network for the Rights of Occupational and Environmental Victim
AOAC	Association of Official Analytical Chemists
BLL	Blood Lead Level
CAGR	Compound Annual Growth Rate
CDC	Center for Diseases Control and Prevention
CEO	Chief Executive Officer
CEPHED	Center for Public Health and Environmental Development
COVID-19	Corona Virus Disease, 2019
DALYs	Disability adjusted life years
DFO	Divisional/District Forest Officer
DoEnvt	Department of Environment
EDC	Endocrine-disrupting chemical
EU	European Union
FDI	Foreign Direct Investment
GAELP	Global Alliance to Eliminate Lead Paint
GAGR	Gross Annu Growth Rate
GDP	Gross Domestic Product
GON	Government of Nepal
GPPP	Green Public Procurement Policy
HCl	Hydrochloric acid
HNO ₃	conc. Nitric acid
IHME	Institute for Health Metrics and Evaluation
ILPPW	International Lead Poisoning Prevention Week
IPEN	International Pollutants Elimination Network
IQ	Intelligence Quotient
KNP	Kansai Nerolac Paint
MOFE	Ministry of Forest and Environment
MOICS	Ministry of Industry, Commerce and Supplies
MOITFE	Ministries of Industry, Tourism, Forest and Environment
MOPE	Ministry of Population and Environment
MOSTE	Ministry of Science, Technology and Environment
NBSM	Nepal Bureau of Standard and Metrology
NESS	Nepal Environmental and Scientific Services
ND	Non-Detectable
NGOs	Non Governmental Organization
NPMA	Nepal Paint Manufacturers Association
NPO	National Professional Officer



NS	Nepal Standard
OEHS	Occupational and Environmental Health and Safety
ppm	Parts per million
SMEs	Small and medium-sized Enterprises
SSNC	Swedish Society for Nature Conservation,
UN	United Nation
UNEP	United Nation Environment Programme
UNICEF	United Nations Children`s Fund
USA	The United States of America
USD	United States Dollar
UV	Ultraviolet
VOC	Volatile Organic Compound
WHO	World Health Organization

BOX 1: Lead Paint Terminology

As used in this report:

- **“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.
- **National Paint:** The paints purely produced from Nepalese owned paint industries
- **Multination Paint:** The paints that produced in Nepal with foreign investment like Asian, Berger and Kanasai Nepal Paints
- **International Paints:** The paints that is not produced but imported to sold & used in Nepal.





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 and also by the Government of Nepal. All lead concentrations in the report are total lead levels unless otherwise specified.

The lead paint standards were promulgated by the **Government of Nepal, Ministry of Forest and Environment-MOFE (the then MOEST) through a gazette notification dated 22 December 2014 with its effective dates 181 days after this notification i.e., from 20th June 2015.** It has three important provisions: (a) Maximum lead in paints imported and domestically produced in Nepal to be not more than 90 ppm; (b) Each paint cans should be labeled with lead content in the paint it contained, and (c) Each paint cans should also be labeled with a protective precautionary message for occupational safety.

From July to August 2021, the CEPHED collected a total of 21 spray paints paint imported, produced, and sold from stores in different cities viz Biratnagar,

Birgunj, Hetauda, Pokhara, Butwal, Kathmandu, Lalitpur, and Bhaktapur of Nepal. The majority of purchased paints (19 samples) were from 7 International spray paint manufacturing companies from India, China, Thailand. 2 samples were purchased from a national industry named National Auto and Spray Udhog Hetauda.

The paints represented 8 different brands produced by 8 (7 International and 1 National) manufacturers. Altogether 7 different color spray paints were included in the samples. Most of these samples were recently produced in the years 2019 to 2021 and no samples were included in the study of older that the Government of Nepal Lead Paints Standard took effect.

All paints were analyzed by an accredited laboratory Nepal Environmental and Scientific Services (NESS) Limited in Nepal for their lead content, based on the dry weight of the paint. The test method applied for lead concentration analysis was direct air acetylene AAS, AOAC, 974.02. The accredited laboratory participates in the Association of Official Analytical Chemists, assuring the reliability of the analytical results.

The analytical methods adopted by the AOAC (Association of Official Analytical Chemists) are used by government agencies concerned with the analysis of fertilizers, foods, feeds, pesticides, drugs, cosmetics, hazardous substances, and other materials related to agriculture, health and welfare, and the environment. AOAC methods are also used by industries to check the compliance of their products.*

Results

14 out of 21 analyzed aerosol spray paints (67 percent of paints) were complying with the Government of Nepal’s lead paint standard, i.e., they contained lead concentrations less than 90 parts per million (ppm, dry weight of paint). 13 out of 21 (62 percent) of total and 13 out 14 (93 percent) of all complying paints has lead concentration at non-detectable (ND) level. This demonstrates that the spray paints that only comply with the lead paint standard of Nepal can be produced as well as imported into Nepal to protect its country fellow especially children and the

* <https://aocs.onlinelibrary.wiley.com/doi/abs/10.1007/BF02670789>

environment. 7 out of 21 analyzed spray paints (33 percent) were non complying the lead paint standard. This is the regulatory limit for lead in paint in Nepal for all kinds of paints being imported, produced, marketed, and used.

Moreover, 2 spray paints (9.52 percent of paints) contained dangerously high lead concentrations above 10,000 ppm. The highest lead concentration detected was 15618.62 ppm (173 times more than the Government of Nepal lead paint standard of 90 ppm) in a yellow color spray paint, LAZER brand of Nippon Paints, China. The other paint sample of the same industry of green color contained the second-highest lead concentration 15070.49 ppm (167 times more than lead paint standard of Nepal) paint sold. Another yellow color sample of the same LAZER brand of Nippon paints company contained the 4th highest lead concentration of 2549.81 ppm (28 times more than standard). The third highest lead concentration of 5357.14ppm (59 times more than the standard limit) was found in red color spray paints samples of nationally produced paints by National Auto and Spray Udhog.

4 out of 8 different industries` produced paints (50 percent of paint industries) sold at least one lead paint, i.e., paint with a lead concentration above 90 ppm including four samples of one of the tops brands LAZER of Nippon paints and also have got 1st, 2nd, 4th and 5th highest lead concentration. Other 3 non-complying samples coming from 1 each of 3 industries namely samples coming from RJ London (7th), Cube (6th), and National Auto and Spray Udyog (3rd).

4 out of 8 analyzed brands (50% percent of paint brands) sold at least one paint with high lead above 90

ppm. 2 paints of 1 brand sold paint with a dangerously high lead concentration above 10,000 ppm.

Yellow, Green, and Red color spray paints most frequently contained high lead concentrations above 90 ppm to over 1,000 ppm. Color-wise, 60% (3 of 5) red, 75% (3 of 4) yellow, and 25% (1 of 4) green contained lead concentrations above 90 ppm. Samples from Yellow, Red, and Green contained lead concentrations above 90 ppm to over 1000 ppm and even yellow and green color plaints have a dangerously high level of lead exceeding over 10,000 ppm.

In general, spray paint can label did not carry meaningful information about lead content and lead-related label as mandatory required by the Government of Nepal, lead paint standard. However, the hazards related precautionary message to avoid occupational exposure, do not spray near a fire source, free from ozone-depleting substances were mentioned in the spray tubes.

Only 4 out of 21 paints (19 percent of spray paints) have lead-free or NO Added Lead..... labels. 1 out of 4 (25 percent) NO ADDED LEAD labeled paints contained a lead concentration of 751 ppm, 8 times more than the Government of Nepal standard limit of 90 ppm.

None of the spray paint samples contained NS Mark Logo.

None of the paints provided information about lead content & Precautionary message as per the requirement of the Lead paint standard on their labels and most paints carried little information about any ingredients on can labels. Therefore, needs to be immediately and strictly regulated.

Compliance Status of Spray Paints in Nepal (CEPHED 2021)

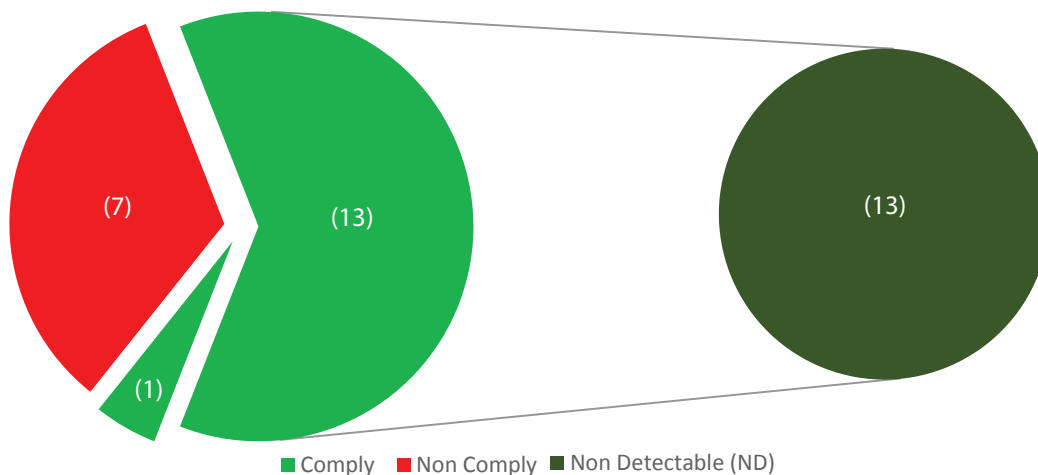


Figure 1: Compliance Status lead paint standard in Spray Paints imported, produced, and used in Nepal

Conclusions and recommendations

This study demonstrates that aerosol solvent-based spray paints with high concentrations of lead have been still sold and available in Nepal since the paints included in this study were brands commonly sold in retail stores all over Nepal. However, the fact that only 14 out of 21 paints (67 percent of paints) contained lead concentrations below 90 ppm indicates that the spray paints that meet the standard can be possible to import and sold in Nepal. Additionally, technology to produce spray paints without added lead exists in Nepal. 7 out of 21 (33 percent of paints) still contained above 90 ppm, urgently called for the effective implementation and strict market and industries monitoring.

None of the paints can have complied with the mandatory provision of labeling about (a) each paint cans should be labeled with lead content in the paint it contained, and (b) each paint cans should also be labeled with a protective precautionary message to prevent the occupational exposure. Therefore, more stringent and effective implementation of standards is urgently needed through the regular market and industry monitoring by the concerned government authorities viz Department of Environment (DoEnv.), MOFE. The study results provide a strong justification to enforce the enacted standard that will ban the manufacture, import, export, distribution, sale, and use of all paints with total lead concentrations greater than 90 ppm.

Regular market and industry monitoring, larger compliance monitoring study, strictly regulating

the import of spray paints and paints products with increased capacity building of the customs offices, adoption of uniform labeling as well as green public procurement policy (GPPP), call back of all leaded paints from market and mass public awareness by all concerned government agencies are highly recommended.

Ban the import and use of leaded pigments, leaded driers and leaded fillers etc. and promotion of non leaded paint ingredients as leaded ingredients are the known source of excess lead contamination into the paints.

Envision national Blood Lead Level (BLL) screening policy and program for all Nepalese children.

Establish fully functional infrastructures including laboratory, human resources and allocation of enough annual budget for BLL testing in each provinces.

Private sector producing, importing, exporting, dealers and retailers should only produce, import, sell, distribute and promote the paints that fully complying with the lead paint standard lead limit of 90 ppm and mandatory provision of labeling about the lead content and precautionary messaging to avoid occupational exposure.

Consumers should avoid purchasing and using paints that are not complying with the standard. Inform the concerned government agencies about the availability of paint without information about lead content, and other chemicals, producing company, date of manufacturing, expiration date in the market shelf, etc.



Figure 2: Studied Spray Paint samples

1. BACKGROUND



There has been an urgent need of conducting compliance monitoring regularly and no any study of lead in spray paint ever conducted of this scale in Nepal and hence this study is being carried out by the CEPHEd in the year 2021 despite of prevailing COVID-19 pandemic situation.

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 are 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 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



Figure 3: Studied Spray Paint samples

ingested lead as adults. Children with nutritional deficiencies absorb ingested lead at an even increased rate.^[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 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. This study revealed huge economic losses in Nepal estimated to 1.5 billion international dollars or 4% of Nepal’s GDP, an amount that is likely much higher than total revenue from lead-related business as a whole in Nepal.

Furthermore, evidence that the lead content of residential paints is significant enough to result in lead poisoning among children has been building since the 1890s when it was first linked to symptoms in children in Australia. One of the first pediatric deaths linked to lead paint in a child’s crib was reported in 1913.^[13]

Estimates from Institute for Health Metrics and Evaluation (IHME) 2017 data, the lead exposure was responsible for 1.06 million deaths from long-term effects. The IHME has also estimated that lead exposure accounts for 24.4 million disability-adjusted life years (DALYs) lost, 63.2% of the global burden of idiopathic developmental intellectual disability, and 10.3% of hypertensive disease.^[14]

High blood lead levels in children aged 6 to 36 months in Kathmandu Valley, Nepal was revealed from a cross-sectional study of associated factors, 2015. Of 312 children enrolled in the study, 64.4% had Blood Lead Level (BLLs) $5\mu\text{g/dL}$. A significant association was found between BLL and exposure to enamel paints in the household in the form of painting materials used in different parts of the house like walls, windows, and doors ($p = 0.001$). Furthermore, multivariate analyses showed that BLLs were 4.5 times higher in children playing with dirt and dust ($p = 0.006$) and that children belonging to the community of lower caste/ethnicity groups had significantly higher BLLs compared to those from the upper caste groups ($p = 0.02$). This study demonstrated that children living in households that have used enamel paints, children belonging to lower caste/ethnic groups, and children frequently playing with dirt and dust had significantly higher BLLs.^[15] This finding is also coherent with three similar previous studies of BLL among school-going children of Nepal.

The latest study report entitled “The Toxic Truth: Children Exposure to Lead Pollution Undermines a Generations of Future Potential” by UNICEF and PURE EARTH, 2020 revealed that 1 in every 3 children-up to 8 million globally-have blood lead levels at or above $5\mu\text{g/dL}$, a level that the US Center for Diseases Control and Prevention (CDC) have determined causes for action and which the

* 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.

World Health Organization (WHO) says may be associated with decreased intelligence in children, behavioral difficulties and learning problems. This study estimates that 6,719, 235 Nepalese children (over 65% of the total child population of Nepal) have elevated BLL (>5 µg/dL) and some 3,512,007 children even had BLL over 10 µg/dL as per the upper bound estimates.^[16] Coherence with Nepalese BLL studies and Nepalese children are under an astonishingly very high level of risk urgently needs to be addressed.

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.^[17-19]

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

Leaded compounds may also be added to enamel paints for use as driers (sometimes called drying agents or drying catalysts). Leaded compounds are also sometimes added to paints used on metal surfaces to inhibit rust or corrosion. The most common of these is lead tetroxide, sometimes called red lead or minium.

Non-leaded pigments, driers, and anti-corrosive agents have been widely available for decades and are used by manufacturers producing the highest quality paints. When a paint manufacturer does not intentionally add lead compounds in the formulation of its paints and takes care to avoid the use of paint ingredients that are contaminated with lead, the lead content of the paint will be

very low—less than 90 parts per million (ppm) lead by dry weight, and frequently down to 10 ppm or less.

1.3 Spray Paint Market and Regulatory Framework in Nepal

From the data obtained from the Department of Customs for the period of Mid July 2020 to 2021, paint and paint-related pigments, driers, and ink from different countries and mainly from India were worth 4526733000 Nepalese Rupees. Small and medium-sized paint manufacturers (SMEs) primarily serve local markets, which makes their percentage of market share hard to obtain.^[20]

Nippon Paint India is a leading producer of high-quality paints and coatings for automotive refinish, industrial and decorative sectors. Nippon Paint India is part of the Nipsea Group which together with Nippon Paint of Japan, forms the largest coatings group in the Asia Pacific and the fourth largest in the world in terms of revenue. Despite the center of business being India, they missed the opportunity in our neighboring country, Nepal. The company has launched the N-power series in the Nepali market. The automotive paint market is very fragmented in Nepal. The study says the market lies between 1.5 billion but they are sure it is much bigger. Assuming this to be their focus, they are looking at a 20% market share and grow gradually. Over three years, they will be a dominant player in the automotive paint market in Nepal. Hence, they are not here to be a player rather they want to be the market leader*.

Nippon Paint's automotive products will be available in the Kathmandu Valley, including regions of Lalitpur and Bhaktapur through its master importer Ruchi Trading. Nippon Paint plans to expand to Pokhara, Narayanghat, Butwal, Biratnagar, Itahari, and other regions through the second half of the year. For now, Automotive Refinishing Paints & Ancillaries under the Superio and N-Power brand, non-paint consumables and solutions under the N-Force brand, and 1K and Aerosol products under the Pylac brand will be available for immediate sale and use**.

* <https://b360nepal.com/the-automotive-paint-market-is-very-fragmented-in-nepal/>

** <https://nepaldrives.com/nippon-paint-enters-nepal-automotive-paint-market/>, 10th March 2020

Article 30 of the Constitution of Nepal provides right to clean environment as one of the Fundamental Rights.

National Environment Policy, 2019 envisaged to regulate and minimize the use of the hazardous chemicals in products to protect Human Health and Environment from the effect of hazardous waste.

Environment Protection Act, 2019 and Environment Protection Regulations, 2020 has following provision related to hazardous substances.

- National definition of Hazardous waste as defined by the Basel Convention. Basel Convention Annex I, Waste Streams (Y12) defined Waste from production, formulation and use inks, pigments, paints, lacquers, varnish and (Y13) waste from production, formulation and use of resins, latex, plasticizers, glue/adhesives.
- No hazardous substances of any kinds shall be imported into Nepal (Section 16, subsection 1)
- A hazardous substance imported contrary to this Act shall be sent to the same country from which it has been imported (Section 16, subsection 5).
- Producer of hazardous waste shall be responsible for managing such a hazardous waste (Section 17, subsection 1).

1.4 Lead Paint Regulatory Framework

Most highly industrial countries adopted laws or regulations to control the lead content of decorative paints beginning in the 1970s and 1980s. The government of Nepal enacted the mandatory lead paint standard on 22 December 2014, which took effect on 20th June 2015. 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 the production of decorative paint is prohibited in the European Union through regulations related to the 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 in the U.S., the Philippines, China, Bangladesh, India, and Nepal is a total maximum lead content and adherence to this ensures that a manufacturer can sell its paint anywhere in the world. This standard is also recommended in the *Model Law and Guidance for Regulating Lead Paint*,* which was developed by the Global Alliance to Eliminate Lead Paint (GAELP) and published by the UN Environment Programme (UNEP) being increasingly adopted by many regulatory governments worldwide. So far more than 70 countries have some regulatory mechanism in place to regulate lead content into decorative paints.

The Government of Nepal gazette a mandatory 90 ppm lead paint standard to protect children's health by eliminating the hazardous levels of lead in paint. It was promulgated through a notification in **Nepal Gazette (Khand 64, Number 30, Part 5, Notice No.3 dated December 22, 2014) by the Government of Nepal, Ministry of Science, Technology, and Environment (MOSTE)** as per the Rule 15 of Environment Protection Regulation 1997. The standard took effect after 181 days (i.e 20th June 2015) of the date of gazette notification.

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

The lead paint standard also requires companies to mandatorily print the lead content of the paint and a precautionary message on the paint can labels. This standard is equally applicable for all types of paints and both for the imported as well as domestically produced paints.

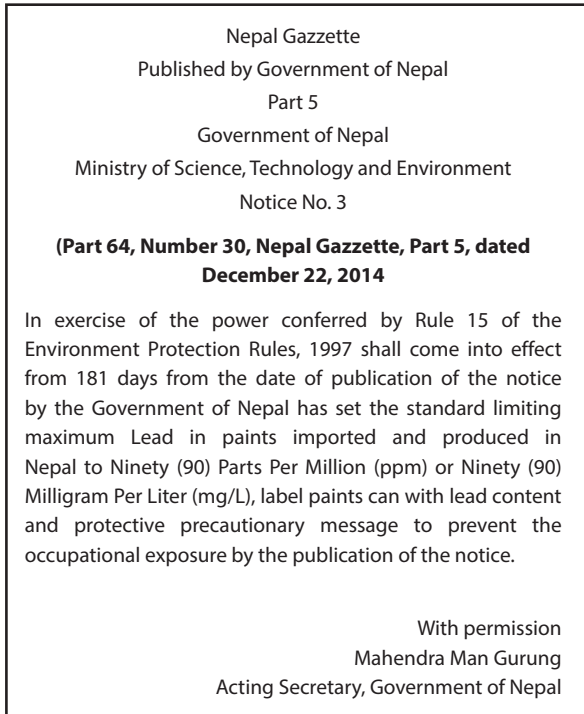


Figure 4: Gazette Standard of 90 ppm lead in paint

Based on the 90 ppm standard, the Department of Education issued a public notice on lead paint on the 15th March 2015. According to notice, "all private and public schools must use non-lead paints or the paints that comply with government standard of 90 ppm lead during their repainting and renovating activities on school furniture and buildings."



Figure 5: Public Notice from Department of Education, Ministry of Education, Government of Nepal.

This mandatory lead paint standard enacted by the Government of Nepal was challenged in the Supreme Court of Nepal by some paint industry and Nepal Paint Manufacturers Association (NPMA) on 17 June 2015, just three days ahead of it supposed to become effective. This writ was sought to nullify a mandatory standard for lead in paint enacted by the Government of Nepal. After several rounds of hearing, On 1st January 2018, Honorable Justice Om Prakash Mishra and Honorable Justice Bam Kumar Shrestha of the Supreme Court of Nepal dismissed the writ filled by NPMA and allied paint industries and reinstate the mandatory lead paint standard is the crucial steps taken by the Supreme Court of Nepal towards the protection of public health especially children health and environment.^[21]

2. STUDY PROCEDURE

From July to August 2021, the CEPHED purchased a total of 21 spray paints paint imported, produced, and sold from stores in different cities viz Biratnagar, Birgunj, Hetauda, Pokhara, Butwal, Kathmandu, Lalitpur, and Bhaktapur. The majority of purchased paints (19 samples) were from 7 International paint manufacturing companies from India, China, Thailand. 2 samples were purchased from a national industry called National Auto and Spray Udhog Hetauda, Nepal.

The paints represented 8 different brands produced by 8 (7 International and 1 National) manufacturers. Altogether 7 different color spray paints were included in the study. Most of these samples were recently produced in the years 2019 to 2021 and no samples were included in the study of older that the Government of Nepal Lead Paints Standard took effect.

In most cases, more bright-colored paint such as yellow, red, green, blue, black, silver, and golden was selected. Additionally. The availability of these paints in retail establishments suggested that they were intended to be used by the consumers.

During the paint sample preparation, information such as color, brand, manufacturer, the country where manufactured, product codes, production dates, and other details as provided on the label of the paint such as Nepal Standard (NS) Mark and Lead-Free and/or No Added Lead..... on each can be recorded. All color shades (7) were recorded and send to the laboratory for the test of total lead.

Colour Distribution of SPRAY Paint Samples

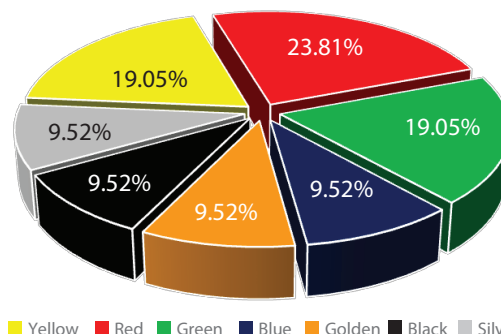


Figure 6: Color distribution of studied spray paints

2.1 Objective of Study

The objectives of this study are:

1. Study of lead in spray paints imported, produced, marketed and used in Nepal.
2. Publish the study report and share among the stakeholders.
3. Release of study report of "Study of Lead in Spray Paints in Nepal" through organizing stakeholder workshops during ILPPW 2021 week of action.

2.2 Study area

Spray paints of different brands which are widely available in different markets were purchased and collected from different parts of the country. Samples were purchased from retail and dealers' paints shops and auto spare parts shops etc. located in major cities/ towns in Nepal. This study were covered 83% (5 of 6) metropolitan cities and 18% (2 of 11) sub-metropolitan cities.

Table 1: Geopolitical distribution of spray paint sample

Geopolitical locations	Province 1	Province 2	Bagmati	Gandaki	Lumbini
Metropolitan city	Biratnagar	Birgunj	Kathmandu, Lalitpur	Pokhara	
Sub metropolitan city			Hetauda		Butwal

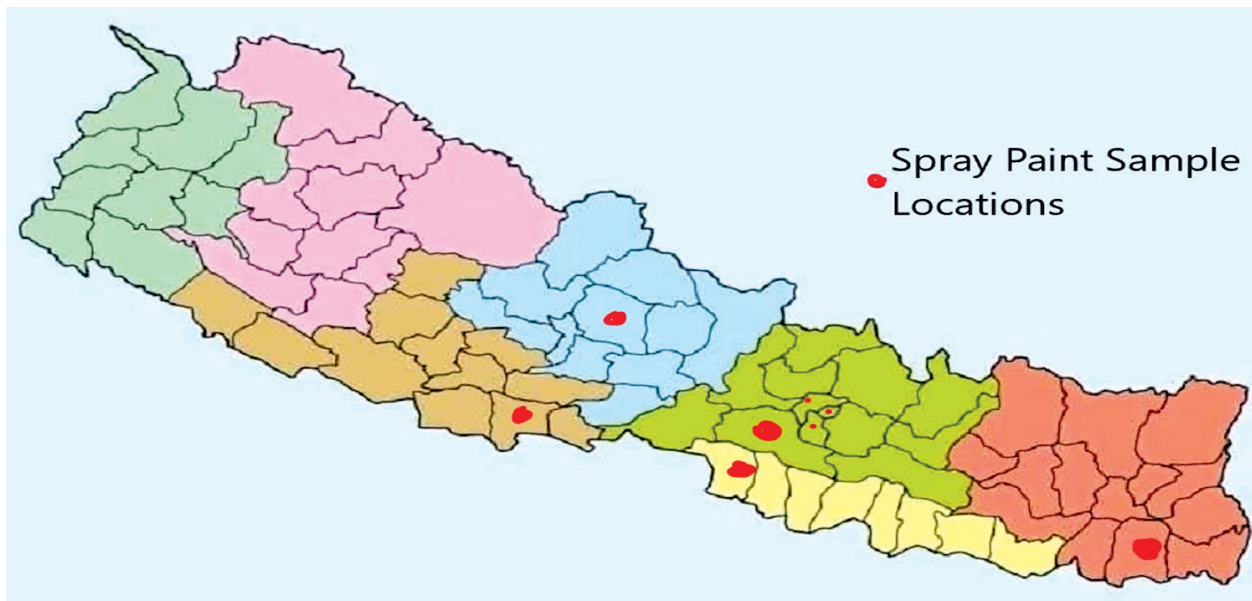


Figure 7: Spray Paint samples collection cities, districts, and provinces.

2.3 Methodology

Sampling and coding

A total of 21 samples of commercially available paint intended for use by consumers were collected. The samples from different companies covering both domestic and imported products were purchased. Sample logs were prepared of paint labeling information to determine the country of origin, presence of any listed ingredients, warning labels, or any specified lead content, lead-related information (e.g., NO Added Lead or Lead-Free), other certification, etc. The manufacture date, batch number, and expiration dates were also be recorded. In addition, paint labels with the Nepal Standard Mark (NS) and/or any self certification label were noted. Multiple colors and brands were selected. Individual colors were selected mainly based on availability with a preference for red, yellow, green, blue, black, silver, and golden. Samples were coded with the help of templates Excel Sheet and were taken to the laboratory of Nepal Environmental and Scientific Services (NESS) for total lead concentration testing using Atomic Absorption Spectroscopy (AAS).

2.4 Lab test

To determine the total lead level in the paint samples, firstly Paint samples were thoroughly mixed by shaking for about 5 minutes. The lid

was opened carefully. The sample was prepared by subsequently applying paint sample on a clean glass plate with a new glass rod and left for at least 72 hrs. for air dry. The air-dried paint was then scrapped off with a clean razor and then kept 2 hours into a hot air oven at 105°C for further drying. 0.2gm of the dried sample will be weighed using an analytical balance and kept in a crucible. The weight of the sample to four decimal places were be recorded. The sample was then placed in a furnace maintaining the temperature of 560°C for converting into ash. In the same crucible 4ml 6N hydrochloric acid (HCl), 4ml 6N conc. Nitric acid (HNO₃) and 10ml of distilled water were added. The solution will be digested in low heat up to a minimum amount. The solution was filtered by using 4l membrane filters to remove volatile organic compounds. Volume was adjusted up to 25ml in a volumetric flask. The solution was then shaken well and pour into a test tube and aspirated in AAS (Atomic Absorption Spectroscopy) where the concentration was determined through an automatic calibration curve.

The laboratory's lower limit of detection for the lead concentration in the paint samples is dependent on the best art of standard laboratory with available equipment. The equipment was used to analyzed all these paint samples included in this study have a very good lower detection limit of 0.01 ppm. One of the sophisticated equipment available in Nepal.

All paints were analyzed by an accredited laboratory Nepal Environmental and Scientific Services (NESS) Limited in Nepal for their lead content, based on the dry weight of the paint. The test method applied for lead concentration analysis was direct air acetylene AAS, AOAC, 974.02. The accredited laboratory participates in the Association of Officials Analytical Chemists, assuring the reliability of the analytical results.

The analytical methods adopted by the AOAC (Association of Official Analytical Chemists) are used by government agencies concerned with the analysis of fertilizers, foods, feeds, pesticides, drugs, cosmetics, hazardous substances, and other materials related to agriculture, health and welfare, and the environment. AOAC methods are also used by industries to check the compliance of their products.



Figure 8: Spray Paints samples collected from different cities of Nepal



3. RESULTS

3.1 Summary of Results

- 14 out of 21 analyzed aerosol spray paints (67 percent of paints) were complying with the Government of Nepal’s lead paint standard, i.e., they contained lead concentrations less than 90 parts per million (ppm, dry weight of paint). 13 out of 21 (62 percent) of total and 13 out 14 (93 percent) of all complying paints has lead concentration at non-detectable (ND) level. This demonstrates that the spray paints that only comply with the lead paint standard of Nepal can be produced and imported into Nepal to protect its country fellow especially children and the environment.
- 7 out of 21 analyzed spray paints (33 percent) were not complying with the lead paint standard. This is the regulatory limit for lead in paint in Nepal for all kinds of paints being imported, produced, marketed, and used.
- Moreover, 2 spray paints (9.52 percent of paints) contained dangerously high lead concentrations above 10,000 ppm. The highest lead concentration detected was 15618.62 ppm (173 times more than the Government of Nepal lead paint standard of 90 ppm) in a yellow color spray paint, LAZER brand of Nippon Paints, China. The other paint sample of the same industry of green color contained the second-highest lead concentration 15070.49 ppm (167 times more than lead paint standard of Nepal) paint sold. Another yellow color sample of the same LAZER brand of Nippon paints company contained the 4th highest lead concentration of 2549.81 ppm (28 times more than standard). The third highest lead concentration of 5357.14ppm (59 times more than the standard limit) was found in red color spray paints samples of nationally produced paints by National Auto and Spray Udhyog.

Compliance Status of Lead paints Standard in Spray Paints, Nepal , CEPHED, 2021

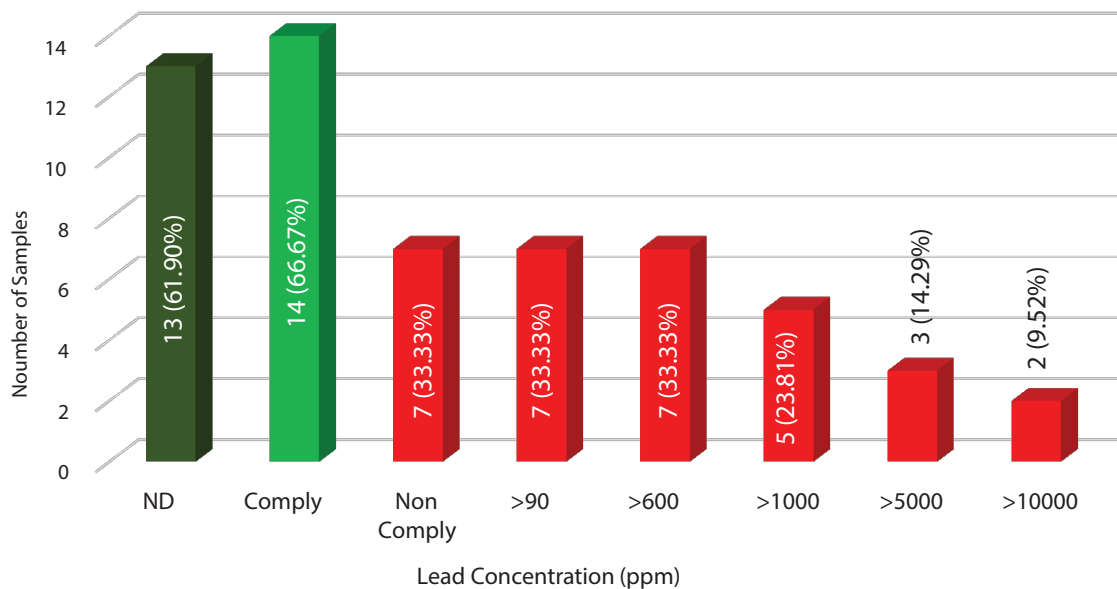


Figure 9: Lead concentration distribution across the spray paint samples

Brandwise Complianace Status across Spray Paints in Nepal

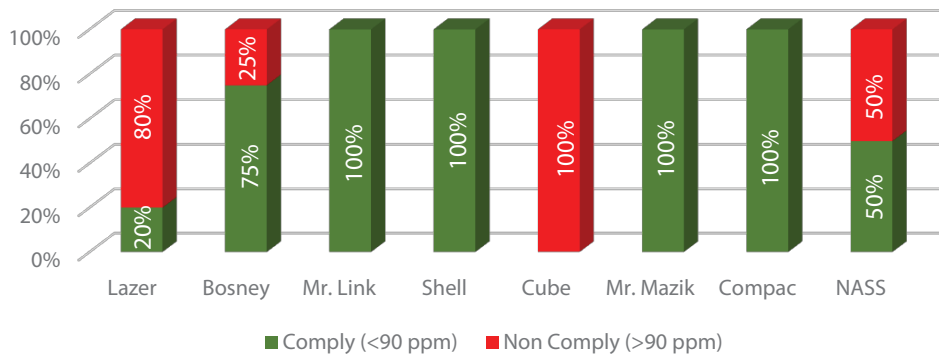


Figure 10: Brand and Industry wise compliance status of the lead paint standard

3.2 Industries and Brand wise lead concentration distribution

14 Spray Paint Samples of 7 Industry and 7 Brands found complying the standard, whereas 7 Spray samples from 4 Industries of 4 brands were found to be non-complying the standards.

4 out of 8 different industries` produced paints (50 percent of paint industries) sold at least one lead paint, i.e., paint with a lead concentration above 90 ppm including four samples of one of the tops brands LAZER of Nippon paints and also have got 1st, 2nd, 4th and 5th highest lead concentration. 1 out of 8 different industries`

produced paint analyzed (12.5 percent of paints companies) sold its 4 out 5 (80%) samples with a lead concentration above 1000 ppm and 2 out of 5 (40%) samples contained dangerously high lead concentrations above 10,000 ppm. Whereas 1 of 5 samples of the same industry has no detectable (ND) level of lead.

Other 3 non-complying samples coming from 1 each of 3 industries namely RJ London (7th), Cube (6th) and National Auto, and Spray Udyog (3rd).

2 out of 8 analyzed brands (25% percent of paint brands) sold at least one spray paint with a very high lead concentration above 1,000 ppm. 2 paints of 1 brand sold paint with a dangerously high lead concentration above 10,000 ppm.

Brandwise Lead Concentration among total samples

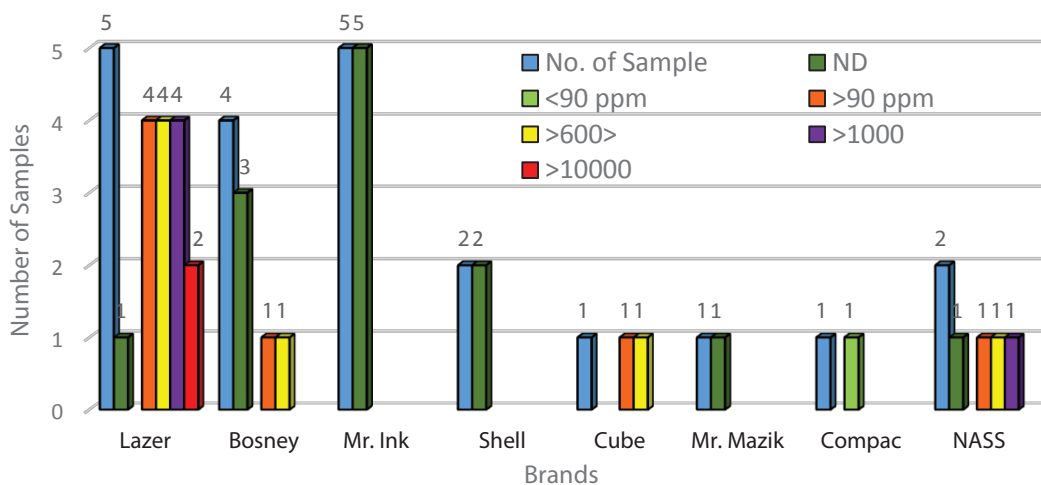


Figure 11: Lead concentration distribution across spray paint brands

Table2: Top Seven leaded spray paints

Brand	Paint Industries	Color	No. of Samples Above 90 ppm	No. of Samples Above 600 ppm	No. of Samples Above 10,000 ppm	Maximum Lead Content (ppm)	Times more than Standard 90 ppm
Lazer	NIPON Paints, China	Yellow	1	1	1	15618.62	173.54
Lazer	NIPON Paints, China	Green	1	1	1	15070.49	176.45
NAAS	National Auto and Spray Udhog Hetauda, Nepal	Red	1	1		5357.14	59.52
Lazer	NIPON Paints, Thailand	Yellow	1	1		2549.81	28.33
Lazer	NIPON Paints, China	Red	1	1		2157.41	23.97
Cube	CUBE	Red	1	1		920.31	10.23
Bosny	RJ London Chemical, Thailand	Yellow	1	1		751.1	8.35
Total	5	3	7	7	2		

3.3 Lead concentration across different colors

This study included seven different colors of spray paints. All 21 spray paint samples comprise 5 Red (23.81%), 4 Green (19.05%), 4 Yellow (19.05%), and 2 each of Blue, Black, Golden, and Silver (9.52%) respectively.

Color Combination of Samples across the paint brands

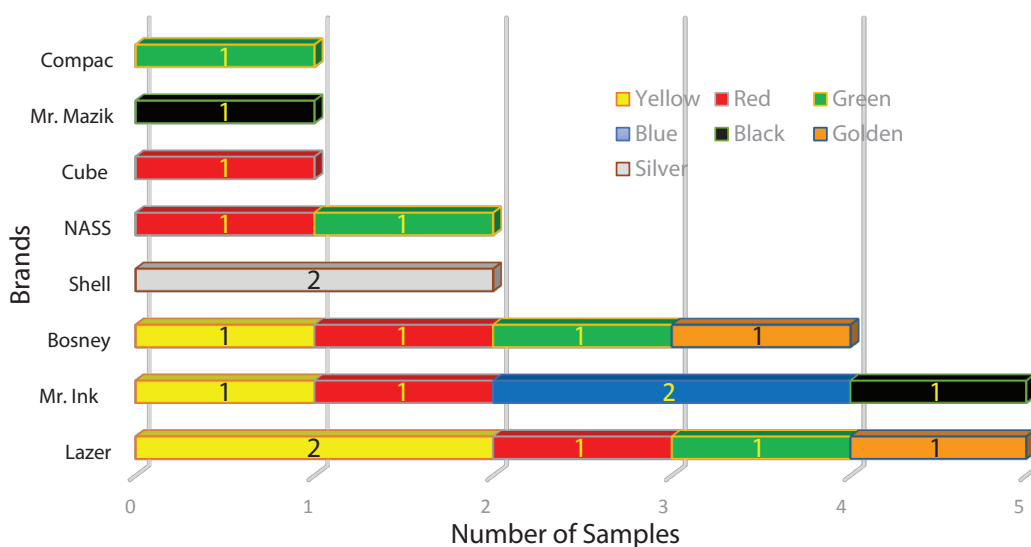


Figure 12: Color distribution across the collected spray paint samples

Color wise Lead Concentration

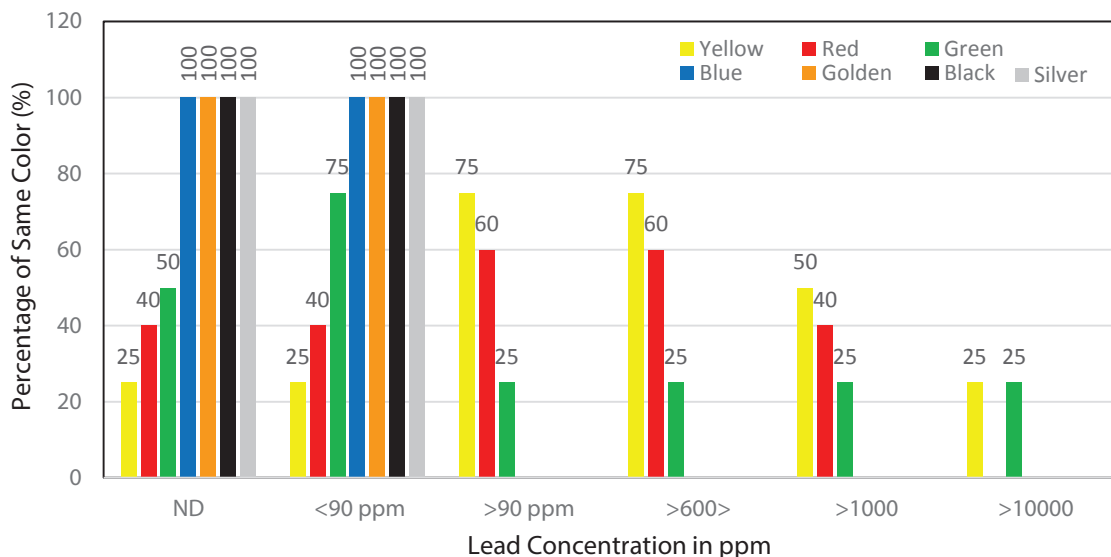


Figure 13: Color-wise lead distribution

The good news for Nepalese consumers is that 13 out of 21 (62%) from most coming at least one from each studied colored samples have no detectable level (<0.01 ppm) of lead and an additional 14 out of total samples 21 (67%) have lead content below government of Nepal lead regulatory limit of 90 ppm.

Color-wise, 60% (3 of 5) red, 75% (3 of 4) yellow, and 25% (1 of 4) green contained lead concentrations above 90 ppm. Samples from Yellow, Red, and Green contained lead concentrations above 90 ppm to over 1000 ppm and even yellow and green color paints have a dangerously high level of lead exceeding over 10,000 ppm.

3.4. Lead Concentrations in Labeled Spray paints

There are three mandatory provisions included in the lead paint standards promulgated by the Government of Nepal on 22 December 2014 that took effect on 20th June 2015.

- (a) Maximum lead-in paints imported and domestically produced in Nepal to be not more than 90 ppm;

- (b) Each paint cans should be labeled with lead content in the paint it contained, and
- (c) Each paint cans should also be labeled with a protective precautionary message for occupational safety.

So looking at these important provisions of mandatory labeling in our standards, in general, NONE OF THE PAINTS that are being imported into and produced within the country of any national (purely Nepalese investment), multinational (Foreign investment /collaboration in Nepal), and International paints (Purely produced outside Nepal) industries carry meaningful information about exact lead content as well as the hazards of the lead paint-related precautionary message as per the mandatory requirement of the Government of Nepal lead paint standards provisions.

Only 4 of 21 have no added lead labeled, one of them has got 751.1 ppm way above than standard limit. None of them got the NS marked but the majority of them got the instruction not to use near fire source as well as containing the logo of not containing Ozone-depleting Substances (ODS).

4. CONCLUSION & RECOMMENDATIONS



This study demonstrates that aerosol-based spray paints with high concentrations of lead are still sold and available in Nepal even after six years passed from the standard took effect. The paints sampled for this study are brands commonly sold in retail stores all over Nepal clearly revealed the status of leaded spray paint distribution in Nepal.

The results of this study provide a strong justification for the strict monitoring of compliance to the country's groundbreaking lead paint regulation that bans total lead content above 90 ppm in all types of paint products, including paints in aerosol cans. The fact that 7 of the 21 (33%) analyzed spray paints had total lead concentrations above the regulatory limit, of which 28.57% (2 of 7) contained dangerously high lead levels exceeding 10,000 ppm, underscores this apparent need for effective compliance monitoring to ensure that only lead-safe paints are offered for sale to consumers. Ensuring that spray paints pose no lead-based hazards is required as these paints are marketed as ideal for almost all types of surfaces and painting applications - e.g., as a touch-up paint for cars and household appliances, as a material for school projects, and as convenient stuff for sprucing up accessories and decors – and are accessible to all consumers.

However, the fact that 14 out of 21 paints (67 percent of paints) contained lead concentrations below 90 ppm including even 13 of 21 (62 percent of paints) even have non-detectable (ND) including one sample from the national spray paint industry indicates that the lead-free spray paints or paints than fully comply with the regulatory limit of 90 ppm lead can only be imported and produced as technology to produce paints without added lead exists in Nepal.

The study results provide a strong justification to strictly enforce a regulation/standard that will ban the manufacture, import, export, distribution, sale, and use of all paints with total lead concentrations greater than 90 ppm. This also prevailed for the

non-compiled paints samples concerning the mandatory requirement provision of labeling about the exact lead content and precautionary message of exposure prevention.

To promote full compliance to the country's phase-out of all lead-containing paints, the CEPHEP recommend the following:

For the Department of Environment (DoEnvt) and Ministry of Forest and Environment (MOFE)

- Convene a multistakeholders' dialogue to recognize successes, determine gaps and identify steps toward more effective enforcement of the regulation banning all lead paints.
- Carry out the larger compliance Monitoring of lead paint standards for all Spray paints and other kinds of paints as well.
- Strengthen the monitoring capacity of three tire concerned governments.
- Ban the import and use of leaded pigments, leaded driers and leaded fillers etc. and promotion of non leaded paint ingredients as leaded ingredients are the known source of excess lead contamination into the paints.
- Implement the Green Public Procurement Policy (GPPP) i.e., only purchase non-lead painted, and effectively implement it, starting from public sectors and then to all other sectors.
- Envision uniform labeling provision and mandatory labeling about lead content and precautionary messaging.
- Raise mass public awareness.

For Department of Health Services (DoHS), Ministry of Health and Population (MOHP), and Nepal Paediatric Society

- Envision national Blood Lead Level (BLL) screening policy and program for all Nepalese children.
- Establish fully functional infrastructures including laboratory, human resources and

allocation of enough annual budget for BLL testing in each provinces.

- Carry out the researches/bio monitoring on lead and other chemical contamination in vulnerable groups of people, workers and communities and make result public.
- Mass public awareness about health impact of lead toxicity and other hazardous chemicals etc.

For Department of Custom and Ministry of Finance

- Regulate strictly the importation of all paints including spray paints and allow only the paints that fully comply with the lead paint standard of Nepal.
- Circulate the strict instruction to all custom entry points for effective surveillance of the paints and paints products.
- Enhance custom entry point technical capacity to test lead in paints and paints products.
- Mass public awareness.

For paint manufacturers, importers and distributors

- Take back their remaining stocks of old lead-containing paints from all retail outlets.
- Only produce, import, sale distribute, and promote the use of paints that fully complying the lead paint standard.

For paint manufacturers, including those that export and import to Nepal

- Obtain third-party Lead Safe Paint certification to assist consumers in making an informed choice when buying paints.

For consumers to insist on their rights

- Carefully look for the product information and to product safety and to stop buying inadequately labeled and uncertified paint products.

For all stakeholders

- Support policies and programs that will contribute to reduced children’s, women’s, and workers’ exposure to lead from lead-containing paint, dust, and soil.



Figure 14: Preparation of sample log before sending for laboratory analysis.



5. REFERENCES

1. Clark, S., et al., Occurrence and determinants of increases in blood lead levels in children shortly after lead hazard control activities. *Environmental Research*, 2004. 96(2): p. 196-205.
2. World Health Organization. *Childhood lead poisoning*. 2010.
3. Lanphear, B.P., et al., The contribution of lead-contaminated house dust and residential soil to children's blood lead levels. *Environmental Research*, 1998. 79(1): p. 51-68.
4. Bellinger, D.C., Very low lead exposures and children's neurodevelopment. *Current Opinion in Pediatrics*, 2008. 20(2): p. 172-177.
5. Bjorklund, K.L., et al., Metals and trace element concentrations in the breast milk of first time healthy mothers: a biological monitoring study. *Environmental Health*, 2012. 11.
6. Needleman, H., Lead Poisoning. *Annual Review of Medicine*, 2004. 55(1): p.209-222.
7. Iavicoli, I., L. Fontana, and A. Bergamaschi, THE EFFECTS OF METALS AS ENDOCRINE DISRUPTORS. *Journal of Toxicology and Environmental Health-Part B-Critical Reviews*, 2009. 12(3): p. 206-223.
8. Verstraeten, S., L. Aimo, and P. Oteiza, Aluminium and lead: molecular mechanisms of brain toxicity. *Archives of Toxicology*, 2008. 82(11): p. 789-802.
9. Prüss-Üstün, A. and C. Corvalán Preventing disease through healthy environments: Towards an estimate of the environmental burden of disease. 2006.
10. World Health Organization. *Lead poisoning and health*. 2015; Available from: <http://www.who.int/mediacentre/factsheets/fs379/en/>.
11. Mielke, H.W. and S. Zahran, The urban rise and fall of air lead (Pb) and the latent surge and retreat of societal violence. *Environment International*, 2012. 43: p. 48-55.
12. Attina, T.M. and L. Trasande, Economic Costs of Childhood Lead Exposure in Low- and Middle-Income Countries. *Environmental Health Perspectives*, 2013. 121(9): p. 1097-1102.
13. Rosner D, Markowitz G, Lanphear B. J. Lockhart Gibson and the discovery of the impact of lead pigments on children's health: A review of a century of knowledge. *Public Health Rep*. 2005;120(3):296–300.
14. Organization WH. *Global Burden of Disease Study 2017*. *Lancet* [Internet]. 2017;1:1–7. Available from: http://www.healthdata.org/sites/default/files/files/policy_report/2019/GBD_2017_Booklet.pdf
15. Dhimal M, Karki KB, Aryal KK, Dhimal B, Joshi HD, Puri S, et al. (2017) High blood levels of lead in children aged 6-36 months in Kathmandu Valley, Nepal: A cross-sectional study of associated factors. *PLoS ONE* 12(6): e0179233. <https://doi.org/10.1371/journal.pone.0179233>
16. 2020, UNICEF and PURE EARTH, *The Toxic Truth: Children Exposure to Lead Pollution Undermines a Generations of Future Potential*
17. Brosché, S., et al., *Asia Regional Paint Report*. 2014.
18. Clark, C.S., et al., The lead content of currently available new residential paint in several Asian countries. *Environmental Research*, 2006. 102(1): p. 9-12.
19. Clark, C.S., et al., Lead levels in new enamel household paints from Asia, Africa, and South America. *Environmental Research*, 2009. 109(7): p. 930-936.
20. Department of Custom of the period of Mid July 2020 to 2021, *Import Statistics*
21. Press Release: The Supreme Court of Nepal Upholds Lead Paint Standard Press Release: The Supreme Court of Nepal Upholds Lead Paint Standard | IPEN

6. APPENDICES

Sample ID	Place of Purchase	Company	Brand	Color	Quantity	Batch no.	Mfd Date	Expired Date	lead-related label	NS Marks	Lead (ppm)
NPL 1	Biratnagar	RJ London Chemical ,Thailand	Bosny	Light Yellow	400cc		19 Aug 2019		Y	N	751.1
NPL 2	Biratnagar	RJ London Chemical, Thailand	Bosny	Green	400cc				Y	N	ND
NPL 3	Biratnagar	RJ London Chemical, Thailand	Bosny	Red	400cc				Y	N	ND
NPL 4	Biratnagar	NIPON Paints, China	Lazer	Red	400cc				N	N	2157.41
NPL 5	Biratnagar	NIPON Paints, China	Lazer	Yellow	400cc		20 March 2020	20 March 2023	N	N	15618.62
NPL 6	Biratnagar	NIPON Paints, China	Lazer	green	400cc		10 March 2021		N	N	15070.49
NPL 7	Biratnagar	R.G.	Shell	Gray Silver	400cc		8 January 2020		N	N	ND
NPL 8	Biratnagar	Mr. Ink, India	Mr. Ink	Blue	400ml		28 May 2020	27 May 2023	N	N	ND
NPL 9	Hetauda	National Auto and Spray Udhog Hetauda	NAAS	green	400cc				N	N	ND
NPL 10	Hetauda	Anjali chem India	Mr Magic	Black	400ml	4896			N	N	ND
NPL 11	Hetauda	NIPON Paints, Thailand	Lazer	Yellow	400cc		10 March 2021		N	N	2549.81
NPL 12	Birgunj	Mr Ink, India	Mr. Ink	Black	400ml		27 May 2021	26 May 2023	N	N	ND
NPL 13	Birgunj	Mr. Ink, India	Mr. Ink	Blue	400ml		10 May 2019	9 May 2022	N	N	ND
NPL 14	Birgunj	Mr. Ink, India	Mr. Ink	Yellow	400ml		10 May 2019	05 May 2022	N	N	ND
NPL 15	Birgunj	Mr. Ink, India	Mr. Ink	Red	400ml		28 May 2020	27 May 2023	N	N	ND
NPL 16	Lalitpur	NIPON Paints, Thailand	Lazer	golden	400cc		30 April 2019	29 April 2022	N	N	ND
NPL 17	Kathmandu	RJ London Chemical, Thailand	Bosny	golden	227g		30 April 2019	29 April 2022	Y	N	ND
NPL 18	Kathmandu	COMPAC industries, Thailand	Compac	green	400cc				N	N	61.74
NPL 19	Bhaktapur	R.G.	Shell	Silver	400cc		4 March 2021	3 March 21	N	N	ND
NPL 20	Butwal	CUBE	CUBE	Orange Red	400 cc		27 May 2019	27 May 2022	N	N	920.31
NPL 21	Pokhara	National Auto and Spray Udhog Hetauda	NAAS	Red	400cc				N	N	5357.14

खण्ड ६४ संख्या ३० नेपाल राजपत्र, भाग ५ मिति २०७१।५।७

सूचना ३

नेपाल सरकारले वातावरण संरक्षण नियमावली, २०५४ को नियम १५ ले दिएको अधिकार प्रयोग गरी यो सूचना प्रकाशन भएको मितिले १८१ औं दिनदेखि लागू हुने गरी नेपालमा आयात एवं उत्पादन हुने रङ्गहरूमा Lead को अधिकतम मात्रा Ninety (90) Part Per Million (ppm) वा Ninety (90) Milligram Per Liter (mg/L) हुनुपर्ने, बढ्दामा Lead को मात्रा र व्यवसायजन्य सुरक्षासम्बन्धी सावधानी मूलक सन्देश समेत उल्लेख गर्नुपर्ने गरी मापदण्ड तोकेकोले यो सूचना प्रकाशन गरिएको छ ।

गोरखापत्र
www.gorhapatronline.com

२०७१ चैत्र १ को आइतबार
2015 March 15 Sunday



नेपाल सरकार
शिक्षा मन्त्रालय
शिक्षा विभाग

विद्यालय शिक्षासम्बन्धी गतिविधि-१३१

घर तथा विद्यालय पूर्वाधारहरू रङ्गाउँदा नेपाल सरकारद्वारा तोकिएको लेडको मापदण्ड ५० पि.पि.एम. अनुसारको रङ्गहरू मात्र प्रयोग गरौं ।

सबै उमेरका मानिसहरू एवं खासगरी बालबालिकाहरू लेड (सिसा) को सम्पर्कमा आएको खण्डमा पढ्ने लेख्ने क्षमता घट्न सक्ने, आनीबानी तथा हाउभाउमा परिवर्तन आउने, स्नायू प्रणाली, प्रजनन प्रणालीमा गडबडी, मानसिक सन्तुलन बिग्रन सक्ने, आदि हुनसक्दछ । लेडले बालबालिकाको शारीरिक, मानसिक तथा बौद्धिक विकासमा निकै नकारात्मक प्रभाव पुऱ्याउँदछ । सर्वसाधारणको घर तथा विद्यालय भवन, फर्निचर, खेलौना, खेलसामग्री, खेलमैदान तथा अन्य भौतिक पूर्वाधारहरू रङ्गाउने रङ्गहरूमा पाइने लेड (सिसा) को असरलाई न्यूनीकरण गर्नका निम्ति नेपाल सरकारद्वारा रङ्गमा लेडको मापदण्ड ९० पि.पि.एम. तोकिएको हुँदा सम्पूर्ण सामुदायिक तथा संस्थागत विद्यालयहरूले बजारमा उपलब्ध लेड नमिसाइएको रङ्गहरू मात्र खरिद गरी प्रयोग गर्नु गराउनु हुन सबै सरोकारवालाको जानकारीको लागि यो सूचना प्रकाशन गरिएको छ ।



GLOBAL ALLIANCE
TO ELIMINATE
LEAD PAINT

unep.org/noleadinpaint



सिसा मुक्त
बालबालिका
स्वस्थ्य भविष्यका लागि



BAN LEAD PAINT

24-30
October

2021



Learn the Risks



Join the Action



**International
Lead
Poisoning
Prevention
Week**

Celebration

in Nepal



Eliminate Lead Paint

#BanLeadPaint

#ILPPW2021



**World Health
Organization**

Nepal



CEPHED

www.who.int/ILPPW/2021



Center for Public Health and Environmental Development (CEPHED)

Kathmandu, Nepal

Phone/Fax: +977-01-5201786 | Mobile: +977 9803047621

Website: www.cephed.org.np | Email: info@cephed.org.np

Supported by



**World Health
Organization**

Nepal