Module F

Summary of Lead Paint Testing in Developing Countries

LEAD PAINT ALLIANCE

Outline

- **Objectives**
- **What is currently known?**
  - Legislation and regulation by country
  - Lead concentrations in paints by country in enamel decorative paints
- **Price Differences between paints with high and low lead content**
- **Recommendations**

Objectives

- Provide an overview of the current status of lead paint in various countries, in terms of legislation, lead levels in paint, and the presence of alternatives to lead paint on the market, based on the following studies:
  - UNEP/ IPEN Nine Country Study (Reference F1)
  - IPEN EU Switch Asia Project (Reference F2)
- Provide recommendations to governments and government agencies in setting up the necessary regulatory framework to phase out lead paint.

UNEP

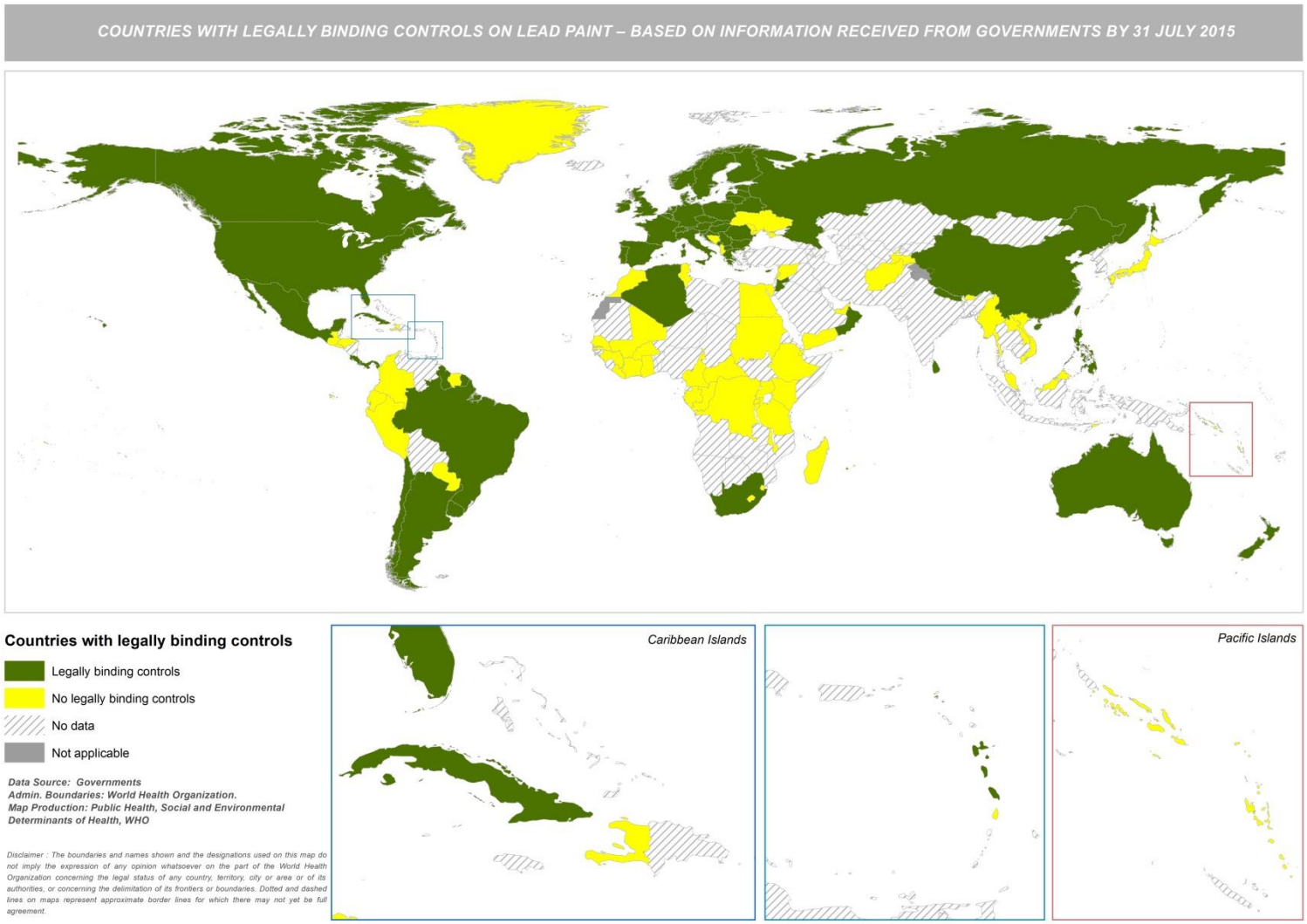
IPEN a toxics-free future

LEAD PAINT ALLIANCE

What is currently known?

Legislation and regulation by country

Status of Regulations on Lead in Decorative Paint



LEAD PAINT ALLIANCE

Status of Regulations on Lead in Decorative Paint- 9 Country Study (Reference F1)

Country	Limits on lead content of sold paints	Third Party Verification (Certification)	Other
Argentina	Resolution 7/2009: prohibits the manufacture and import for use of paints, lacquers and varnishes containing more 0.06% lead in the non-volatile portion of the paint (dry weight). No full compliance yet	No	-
Azerbaijan	No	Cabinet decision 343 (July 1, 1993) and other decisions addressing mandatory certifications to ensure that products, processes and services are in conformity with mandatory requirements of regulatory documents	Rules which prohibit children under the age of 18 from working in facilities where exposure to lead is likely.
Chile	Decree in 1997: establishes the maximum lead content allowed in paints, varnishes and similar coating materials of no greater than 0.06% (600 ppm) lead, by weight.	Compliance monitoring is the responsibility of regional and metropolitan health services, and violations are to be punished under the National Health Code. monitoring is the responsibility of the regional and metropolitan health services and violations are to be punished under the National Health Code	-
Cote d'Ivoire	No	No	-
Ethiopia	No	No	-
Ghana	No	No	-
Kyrgyzstan	No	No	-
Tunisia	No	No	-
Uruguay	Article 5º of Law No.17,775: controls the lead content of decorative paint. It covers architectural paints, varnishes and similar surface coatings, and it establishes that the maximum lead content of such paints must be less than or equal to 600 ppm determined on a dry basis or total non-volatile content.	No	-

LEAD PAINT ALLIANCE

Status of Regulations on Lead in Decorative Paint–
IPEN EU Switch Asia Project (Reference F2)

Country	Limits on lead content of sold paints	Mandatory Labeling and Warning about the Hazards of Lead (Consumer Information)	Third Party Verification (Certification)
Bangladesh	No	No	No
Indonesia	No	No	No
India	Voluntary standard limiting the lead content of enamel decorative paints to 90 ppm (set to 1000 ppm at the time of the study)	No	No
Nepal	No	No	No
Philippines	Chemical Control Order prohibiting lead levels in decorative paint above 90 ppm	No	No
Sri Lanka	Limits on lead content of sold and manufactured paints set to 600 ppm (as of January 2013)	No	No
Thailand	Voluntary limit of lead in enamel decorative paints of 100 ppm	No	No

What is currently known?

Lead concentrations in paints by country in enamel decorative paints

Total Lead Concentration by Country

9 Country Study (Reference F1)

Country	Number of Paints	Number of Brands	Average Lead Concentration (ppm)	Percent greater than 90 ppm (Number)	Percent greater than 600 ppm (Number)	Percent greater than 10,000 ppm (Number)	Minimum ppm	Maximum ppm
Argentina	30	12	17,000	23% (7)	23% (7)	17% (5)	<5	130,000
Azerbaijian	30	16	2,600	77% (23)	67% (20)	7% (2)	<5	20,000
Chile	23	6	52.6	4% (1)	4% (1)	0% (0)	<5	1,100
Cote d'Ivoire	20	7	8,700	70% (14)	65% (13)	25% (5)	<5	42,000
Cote d'Ivoire Anti Corrosive Paints	10	5	27,500	80% (8)	80% (8)	10% (1)	<15	260,000
Ethiopia	23	8	18,500	87% (20)	83% (19)	30% (7)	<15	130,000
Ghana	18	8	5,030	33% (6)	28% (5)	17% (3)	<5	42,000
Kyrgyzstan	30	11	7,160	67% (20)	57% (17)	10% (3)	<5	99,000
Tunisia	30	16	17,900	70% (21)	63% (19)	27% (8)	<5	170,000
Uruguay	30	10	9.8	0% (0)	0% (0)	0% (0)	<5	63

Total Lead Concentration by Country

IPEN EU Switch Asia Project (Reference F2)

Country	Number of Paints	Number of Brands	Average Lead Concentraion (ppm)	Percent greater than 90 ppm (Number)	Percent greater than 600 ppm (Number)	Percent greater than 10,000 ppm (Number)	Minimum ppm	Maximum ppm
Bangladesh	90	34	11,900	71% (64)	64% (58)	28% (25)	<8	123,000
India	250	147	22,800	90% (224)	83% (207)	44% (111)	<8	160,000
Indonesia	78	43	17,300	77% (60)	62% *48)	33% (26)	<12	116,000
Nepal	49	21	16,600	71% (35)	65% (32)	29% (14)	<9	130,000
Philippines	122	34	18,500	61% (75)	52% (63)	39% (48)	<8	156,000
Sri Lanka	94	57	11,600	63% (59)	50% (47)	24% (23)	<6	131,000
Thailand	120	68	19,100	79% (95)	69% (83)	40% (48)	<9	95,000
All samples	803	404	18,000	76% (612)	67% (538)	37% (295)	<6	160,000

LEAD PAINT ALLIANCE

Total Lead Concentration by Country – Global Data

University- based Teams and NGOs Study

Country	Year of Study/Report	Number of Samples	Average, ppm Lead	Percent of Samples greater than 90 ppm lead	Percent of Samples greater than 600 ppm lead	Percent of Samples greater than 10000 ppm lead
Argentina	2013	30	17,000	23%	23%	17%
Azerbaijian	2013	30	2,570	70%	60%	7%
Armenia	2013	26	24,800	77%	77%	38%
Bangladesh	2011	6	42,300	100%	100%	83%
Belarus	2009	22	5,560	82%	68%	9%
Brazil	2013/2011	20	5,644	35%	30%	10%
Brazil	2009	24	15,000	42%	37%	21%
Cameroon	2011	60	23,100	67%	65%	Not Available
Chile	2013	23	52.6	4.3%	4.3%	0%
China	2006	64	15,100	44%	33%	25%
China	2008	58	Not available	Not available	50%	Not available
China (Taiwan)	2011	15	24,000	56%	56%	Not available
Cote d'Ivoire	2013	20	8,700	70%	65%	25%
Egypt	2006	20	26,200	65%	65%	Not available
Ecuador	2009	10	32,000	70%	60%	Not available
Ethiopia	2013	23	18,500	87%	83%	30%
Ghana	2013	18	5,030	33%	28%	17%
India	2006	72	29,700	88%	82%	47%
India	1999	24	50,800	100%	92%	54%
India	2007/2009	31	26,100	Not available	84%	Not available
India	2009	22	9,410	36%	36%	36%
India	2009	25	32,700	72%	72%	64%
India	2009	26	16,600	50%	50%	19%
Indonesia		11	14,800	82%	73%	36%
Kazakhstan	2013	26	15,700	81%	77%	38%

Total Lead Concentration by Country – Global Data

University- based Teams and NGOs Study (continued)

Country	Year of Study/Report	Number of Samples	Average, ppm Lead	Percent of Samples greater than 90 ppm lead	Percent of Samples greater than 600 ppm lead	Percent of Samples greater than 10000 ppm lead
Kenya	2012	31	14,900	87%	81%	39%
Krygyzstan	2013	30	7,160	67%	57%	10%
Lebanon	2012	15	48,300	87%	73%	53%
Malaysia	2009	72	24,500	60%	50%	39%
Mexico	2009	20	51,900	100%	100%	95%
Nepal	2011	12	28,400	67%	33%	33%
Nigeria	2009	23	37,000	100%	100%	65%
Nigeria	2006	25	15,800	96%	96%	44%
Paraguay	2012	15	23,100	27%	27%	20%
Peru	2009	10	11,600	90%	80%	40%
Philippines	2009	15	28,400	67%	60%	27%
Russia	2012	21	8,340	76%	67%	19%
Senegal	2009	21	5,870	86%	76%	19%
Seychelles		28	24,900	75%	61%	43%
Singapore		41	6,990	44%	37%	7%
South Africa	2009	29	19,900	65%	62%	28%
Sri Lanka	2009	19	25,200	68%	68%	37%
Tanzania	2009	20	14,500	100%	95%	25%
Thailand	2009	17	61,900	47%	47%	41%
Thailand	2010	31	13,000	87%	84%	55%
Tunisia	2013	30	17,900	70%	57%	27%
Uruguay	2013	30	9.8	0%	0%	0%

Key Findings

- Countries that have established regulatory frameworks have lower lead paint levels

- In Chile and Uruguay, all the enamel decorative paints tested had low total concentrations. Both Chile and Uruguay have recently enacted national executive decrees that prohibit the production, sale and use of decorative paints with lead concentration above 600 ppm

Key Findings

- Many of the paints tested would not meet regulatory standards established in most highly industrialized countries (90 ppm being the regulatory limit in the US, and 600 ppm in less restrictive countries)

- Paints with extremely high levels of lead are still available in many countries (lead concentrations higher than 10,000 ppm)

- In most countries with lead paint, equivalent paint with no added lead is available

Total Lead Concentration by Country and Color

9 Country Study

Country	Number of White Paints Sampled	White Max/Min ppm	Number of Red Paints Sampled	Red Max/Min ppm	Number of Yellow Paints Sampled	Yellow Max/Min ppm
Argentina	10	3,900/<5	8	73,000/<5	9	130,000/<5
Azerbaijan	11	4,000/16	9	12,000/18	1	20,000/20,000
Chile	5	5/<5	11	1,100/<5	7	28/<5
Cote d'Ivoire	8	9,400/<5	6	7,700/<15	6	42,000/<15
Ethiopia	8	5,500/<15	7	25,000/44	7	130,000/8,500
Ghana	7	27/<5	4	22,200/<15	7	42,000/<5
Kyrgyzstan	11	4,200/<15	8	99,000/<5	7	73,000/<5
Tunisia	7	1,900/<5	7	30,000/<5	5	170,000/<5
Uruguay	10	63/<5	9	55/<5	9	<15/<5
Total	77		69		58	

Total Lead Concentration by Color – Additional Colors
9 Country Study

Color	Number of Samples	Number of Countries	Minimum ppm Lead	Maximum ppm Lead	Number of Samples greater than or equal to 90 ppm Lead	Number of Samples greater than or equal to 600 ppm Lead	Number of Samples greater than or equal to 10,000 ppm Lead
Aluminum	2	1	250	6,500	2	1	0
Black	3	2	<5	1,000	1	1	0
Blue	4	2	<5	2,700	3	3	0
Brown	3	1	52	1,600	2	2	0
Coffee	4	1	<5	2,000	2	2	0
Green	8	5	<15	110,000	6	6	4
Grey	3	2	<5	1,500	6	6	1

Key Findings

- **White** paints have the lowest lead content: white lead pigments are now rarely used in decorative paints
- Lead- based driers are still used in some enamel decorative paints
- **Yellow**, **red**, **green** and other brightly colored paints have the highest lead content, yellow having the highest
- Some of the yellow, red and green decorative paints tested contain lead-based pigments in their formulations

Total Lead Concentration by Country and Color

Lead Content of White Paints

IPEN EU Switch Asia Project

Country	Number of Paints	Average Lead Concentration (ppm)	Percent greater than 90 ppm (Number)	Percent greater than 600 ppm (Number)	Percent greater than 10,000 ppm (Number)	Minimum ppm	Maximum ppm
Bangladesh	30	3,330	63% (19)	57% (17)	10% (3)	<8	23,000
India	115	4,000	86% (99)	74% (85)	6% (7)	<8	52,000
Indonesia	32	2,580	72% (23)	53% (17)	0% (0)	12	10,000
Nepal	19	1,440	63% (12)	53% (10)	0% (0)	11	6,100
Philippines	33	455	30% (10)	18% (6)	0% (0)	<8	4,700
Sri Lanka	32	2,260	44% (14)	31% (10)	3% (1)	<9	39,000
Thailand	52	1,840	62% (32)	46% (24)	0% (0)	<9	9,500
Total	313	2,700	67% (209)	54% (169)	4% (11)	<8	52,000

LEAD PAINT ALLIANCE

Total Lead Concentration by Country and Color

Lead Content of Colored Paints

IPEN EU Switch Asia Project

Country	Number of Paints	Average Lead Concentraion (ppm)	Percent greater than 90 ppm (Number)	Percent greater than 600 ppm (Number)	Percent greater than 10,000 ppm (Number)	Minimum ppm	Maximum ppm
Bangladesh	60	16,200	75% (45)	68% (41)	37% (22)	<8	123,000
India	135	38,800	93% (125)	90% (122)	77% (104)	<8	160,000
Indonesia	46	27,500	80% (37)	67% (31)	57% (26)	<12	116,000
Nepal	30	26,200	77% (23)	73% (22)	47% (14)	<9	130,000
Philippines	89	25,200	73% (65)	64% (57)	54% (48)	<8	156,000
Sri Lanka	62	16,300	73% (45)	60% (37)	35% (22)	<6	131,000
Thailand	68	32,300	93% (63)	87% (59)	71% (48)	26	95,000
Total	490	28,000	82% (403)	75% (369)	58% (284)	<8	160,000

Key Findings

- **White Paints** contained the lowest amount of lead
- White lead pigments are now rarely used in enamel decorative paints due to superior properties of the lead-free alternatives
- The high frequency of white paints with a lead content > 600 ppm suggests that lead-based driers are still used in many enamel decorative paints
- Leaded pigments are still used in many **brightly** colored paints

Price differences between paints with high and low lead content

Average Price of White Paints

IPEN EU Switch Asia Project

Country	Low lead content (< 90 ppm)	High lead content (> 90 ppm)	Price difference between paints with low and high lead content, local currency (EUR/USD)	Price difference (% of price of low lead paints compared to high lead paints)
Bangladesh	372 BDT	385 BDT	-13 (-0.12/-0.16)	97%
India	324 INR	354 INR	-30 (-0.35/-0.48)	92%
Indonesia	44423 IDR	49822 IDR	-5399 (-0.34/-0.46)	89%
Philippines	238 PHP	313 PHP	-75 (-1.23/-1.68)	76%
Sri Lanka	1018 LKR	981 LKR	37 (0.21/0.28)	104%
Thailand	170 THB	145 THB	24 (0.55/0.75)	117%

LEAD PAINT ALLIANCE

Average Price of Colored Paints

IPEN EU Switch Asia Project

Country	Low lead content (< 90 ppm)	High lead content (> 90 ppm)	Price difference between paints with low and high lead content, local currency (EUR/USD)	Price difference (% of price of low lead paints compared to high lead paints)
Bangladesh	304 BDT	434 BDT	-130 (-1.22/-1.66)	70%
India	332 INR	306 INR	26 (0.31/0.42)	109%
Indonesia	58330 IDR	43884 IDR	14446 (0.91/1.24)	133%
Philippines	277 PHP	276 PHP	0.2 (0.00)	100%
Sri Lanka	829 LKR	915 LKR	-86 (-0.48/-0.66)	91%
Thailand	224 THB	161 THB	63 (1.41/1.93)	139%

Key Findings

- Only small differences in retail prices were seen when the average prices of white and colored paints, with and without high lead content, were compared
- Although the average price of white paints with low lead levels were in some cases higher, the actual increase in average price amounted to only a maximum of 0.55 Euro per liter
- Although the average price of colored paints with low lead levels were in some cases higher, the actual increase in average price amounted to only a maximum of 1.41 Euro per liter.

Recommendations
Government and government agencies

- Fast track the approval of a strong regulation that will ban the manufacture, importation, exportation, distribution, sale and use of lead paints and products coated with lead paints.
- Establish monitoring programs along with strong enforcement measures to ensure paint companies are in compliance with the set standard
- Provide incentives to paint companies to swiftly transition from lead to non- lead paint production
- Consider paint container labeling on lead content and lead dust hazards as a part of regulations

LEAD PAINT ALLIANCE

Recommendations
Government and government agencies (continued)

- Source only unleaded paints for interiors of public buildings, schools, day care centers, and facilities frequented by children such as parks, playgrounds and health care facilities
- Make information available on the negative impact of the lead exposure through health channels

LEAD PAINT ALLIANCE

References

F1. UNEP/IPEN (2013). Lead in Enamel Decorative Paint: National Paint Testing Results: A Nine Country Study.

F2. Brosché, S., Denney, V., Weinberg, J., Calonzo, M., Withanage, H., Clark, S. (2014). Asia Regional Paint Report (EU/IPEN).

UNEP

IPEN
a toxics-free future

Pb
LEAD PAINT ALLIANCE

Point of Contact

Juan Caicedo

UNEP DTIE Chemicals Branch

United Nations Environment Programme

International Environment House, Room C 207

11-13 Chemin des Anémones

CH-1219 Châtelaine

Geneva, Switzerland

juan.caicedo@unep.org