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UNIVERSITY OF CAPE TOWN



COMMUNITY OF PRACTICE ON LEAD IN PAINT

Organized by the SAICM Secretariat and the University of Cape Town

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Discussion Digest

Topic of Discussion: Is there lead in my paint? All about testing and labs.

The fourth Lead in Paint Community of Practice (LiP CoP) discussion for 2021, introduced by Mihaela Paun from UNEP, explored the role of lead paint testing in eliminating lead paint. Jeiel Guarino from IPEN presented on testing for awareness raising. Tamar Berman from the Israel Ministry of Health presented on testing for regulatory development and implementation. Dr Adam Kiefer presented on testing for research to compare screening and compliance testing applications.

To view the PowerPoint presentation of the discussion, click here.

ABOUT THE PRESENTERS



Mihaela Claudia Paun joined the Knowledge and Risk Unit at UNEP's Chemicals and Health Branch – Economy Division in September 2021 as a Programme Management Officer. She primarily focuses on the provision of project and program management on the prevention, minimization, and environmentally sound management of persistent organic pollutants (POPs) and on lead paint-related activities. Ms. Paun started her career more than 16 years ago in the Ministry of Environment of Romania in the fields of chemicals and waste and industrial pollution control.



Jeiel Guarino works as a global campaigner of IPEN's Global Lead Paint Elimination Campaign, which aims to end the manufacture, import, export, sale, and use of lead-containing paints and similar surface coatings worldwide. IPEN is a global network of NGOs in over 125 countries working together for a world in which toxic chemicals are no longer produced or used in ways that harm human health and the environment.



Tamar Berman is Chief Toxicologist of Environmental Health at the Ministry of Health in Israel. Tamar is involved in policy decisions on environmental chemicals including pesticides, chemicals in drinking water, and chemicals in consumer products. Tamar conducts research on children's exposures to environmental chemicals in paints, flooring materials, drinking water, and environmental tobacco smoke.



Adam M. Kiefer is a Distinguished University Professor of Chemistry at Mercer University in Macon, Georgia, USA. Dr. Kiefer has worked for over a decade in artisanal and small-scale gold mining communities, monitoring mercury pollution associated with mining practices. Recently, his team utilized portable ED-XRF to screen for high concentrations of lead paint in schools and playgrounds in Guyana. Further lab analysis quantified these results, and samples of new paint exceeded the Guyanese standard for lead in paint (600 ppm) by several orders of magnitude. He is currently developing new methods to accurately quantify lead concentrations in paint in the field.



Lead in Paint Community of Practice 2021 Discussion 4 Summary

- 1. UNEP noted that testing of lead paint is an important part of the lead paint discussion, and can be used for awareness-raising, checking compliance, and research purposes. Lead paint testing is a key element to the UNEP Model Law and Guidance for Regulating Lead Paint, in which it is used to verify and document compliance with a 90-ppm limit for lead in paint. The Model Law contains requires manufacturers (or importers of paint) to submit sufficient samples of paints to an internationally accredited third-party laboratory for testing compliance within the limit. The Model Law also gives authority to governments for conducting facility inspections and testing of lead paint. Data on the lead content of paints assists government officials and the public in knowing when high lead contents are for sale on the national market. Current lack of in-country laboratory capacity need not be an impediment to a lead paint law going into effect, as the industry can still comply with the law by sending paint samples to accredited laboratories in other countries. Additionally, for imported paints, manufacturers and importers can rely on test results from qualified laboratories in the country of origin (as per the Model Law in certain circumstances). The World Health Organization (WHO) published its second edition of the Brief guide to analytical methods for measuring lead in paint, which outlines the various methods available for measuring lead in existing paint and new paint.
- 2. IPEN noted that lead paint testing can help raise public awareness about lead paint and lead exposure can also aid in reaching out to manufacturers to reformulate lead paint and encourage governments to promulgate lead paint regulations. If lead paint testing resources are constrained, IPEN suggested prioritizing sample of solvent-based, decorative, and bright colored paints. IPEN also provided a detailed methodology for sampling lead in paint and examples of barriers to testing but emphasized that the lack of available data in a country should not deter governments and industries to take immediate action. Countries may be able to find data on lead paint from nearby countries or from countries with similar economic standing. Participants discussed the purpose of testing in their countries, including for branding and corporate social responsibility and as an advocacy tool to promote or develop lead paint regulations. Participants noted barriers to testing, including storage disposal of paint cans after testing, logistical difficulties in shipping samples, the lack of qualified personnel, and the lack of accredited laboratories that test for lead content in paints.
- 3. The Ministry of Health (MOH) in Israel provided a case study about how testing made a difference in regulating lead paint. Testing of playground equipment and spray paints showed high levels. With these results, the MOH went back to the paint industry and other stakeholders and was able to achieve consensus for the need to change the standard for paints. The new standard is mandatory and requires lead content in all paints to be below 90 ppm. It is also very important to remain vigilant that the law is enforced, as follow up testing in Israel found exceedances of the limit. Considering these findings, the government conducted more outreach efforts to raise awareness about the new standard among both manufacturers and importers. Participants shared their experiences about how testing has been helpful in their countries, including: promoting and guiding development of a lead paint regulation by the government; helping to promote voluntary action by the paint industry to reformulate lead paint; and raising awareness of the issue to the government and stakeholders. Some noted that no progress has been made yet despite lead paint testing. Mercer University discussed how needs determine the analytical method used. Screening results can be obtained by portable X-ray Fluorescence analyzer (pXRF). Accurate quantification for compliance can be conducted through labbased spectroscopy, such as Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) and Graphic Furnace Atomic Spectroscopy (GF-AAS). Mercer shared how it is working to combine the accuracy of lab-based spectroscopy with the accessible, low cost, and fast sample acquisition of pXRF for assessing lead in new paints. Some participants shared that pXRF was used to test for spray paints and lead in paint scraped from surfaces. Some also sent samples for lab-based testing in the US. One participant noted the potential to use Smartphone technology for testing, though this has not yet been developed for lead paint. In answer to questions by participants, experts noted that available pXRF methods include ASTM F2853 and ASTM E2119-20.

ANNEX

DETAILED SUMMARY OF 2021 DISCUSSION 4

<u>Disclaimer</u>: The information in this digest represents the opinions of members participating from different stakeholder groups expressed during the discussion. The views expressed in this document do not necessarily represent the opinion or the stated policy of the United Nations Environment Programme, the SAICM Secretariat, the GEF or UCT, nor does citing of trade names or commercial processes constitute endorsement.

THE DISCUSSION WAS STRUCTURED AROUND THREE QUESTIONS AND THE KEY DISCUSSION INPUTS FROM PARTICIPANTS ARE PRESENTED UNDER EACH:

Question 1. Why is paint testing being conducted in your country and, if it is not, what are the barriers?

	 on walls. The RRP program requires that firms performing renovation, repair and painting projects that disturb lead-based paint in homes, childcare facilities and pre-schools built before 1978 be certified by EPA (or an EPA-authorized state), use certified renovators who are trained by EPA-approved training providers and follow lead-safe work practices.] To sample dried paint for lead analysis, see ASTM D1729 (Standard Practice for Visual Appraisal of Colors and Color Differences of Diffusely Illuminated Opaque Materials, https://www.astm.org/) [Note: This practice specifies the equipment and procedures for visual appraisal of the colors and color differences of opaque materials that are diffusely illuminated. (D1129, www.astm.org)] The use of smartphane devices can produce large data sets for detamining planning.
PRESENTER's	- It is important to define "regularly test".
comment	- IPEN Summary of Testing Lead Paint in Low- and Middle-Income Countries:
(Elena Jardan, WHO):	https://wedocs.unep.org/bitstream/handle/20.500.11822/36971/LeadF.pdf?sequence=3&isAllowed=y

Throughout the discussion, informal polls were conducted to help encourage discussion among the participants. They do not provide any representative data but rather provide a snapshot of participant views.





Poll 3 Results (N=5)

How have you or would you overcome challenges to testing? (Indicate your country and give a short answer)

Seeking guidance and support

• Malaysia (NGO): "IPEN provided guidance & support."

Laboratory accreditation.

- South Africa (Government): "Constant follow up with authorities on lab accreditation."
- **Tunisia (Government):** "Publish the new regulation first and then proceed to accredit our national laboratories for these parameters."

Capacity building

• Sierra Leone (Government): "Capacity building needed in terms of instrumentation and analysis."

Sharing testing results

• Vietnam (NGO): "We have tried to collect paint samples as widely as possible across the country to cover the geographic characteristics, then we are sharing test results with government agencies, paint producers."

Question 2. How has lead paint testing made a difference in your country? If you are not testing, how could it be helpful?

Country	Participant's responses
Malaysia (Private Sector)	 The government is now developing a lead-free paint standard (architectural coating) after the test results were publicized
(NGO)	 In the Philippines, many people from the government and industry did not know that lead is still being used in paints. When EcoWaste Coalition first found out about this in 2007, they published their research, and raised awareness with the media. The industry was taken by surprise with this information as well. The bigger manufacturers then started reformulating after this study was released. The government has also started developing laws on lead in paint since 2007. Having the NGO and industry on the same page concerning regulating lead paint, led to the adoption of the law.
Senegal (NGO)	 Lead paint testing done by PAN Africa allows the country to have the only data available on lead paint. This lead paint testing gives more information onhigh-level lead contained in some paints. Testing is conducted but there is no real progress.
Sierra Leone (Academia)	 No testing has been done yet, but testing will be helpful to determine a baseline that will guide the development of standards. A draft regulation is ready.
Tunisia (Government)	 Tunisia developed the awareness of industrials through a campaign for lead testing. Paint testing is done for household paints with solvents for all the colours. Many industries since 2016 stopped using lead in their paints voluntarily.
United States of America (USA) (Government)	 The US EPA developed the Renovation, Repair and Painting (RRP) Program. [Note: The EPA RRP Program handles legacy paint - existing paint on walls.] The current program, however, lacks enforcement, diluting its effectiveness. Mobile apps can be required to understand lead standard adoption and implementation rates.
Vietnam (NGO)	 In 2016, paint testing results showed remarkably high ppm (even at a very dangerous level). This resulted in awareness being raised in Vietnam, attracting the attention of local stakeholders and government agencies; saying that lead-free paint producing techniques already existed in Vietnam. Since then, Vietnam has made efforts to eliminate lead in paint, especially in architectural solvent-based paint. In 2020 when the Vietnam government issued a national technical regulation on lead paint, most of the paint samples had lead concentration under 90ppm.
PRESENTER'S COMMENTS (Jeiel Guarino, IPEN):	 Is there a paint industry association in Senegal? In the Philippines, having the NGO and industry on the same page with respect to regulating lead paint, led to the adoption of the law. The leading paint manufacturer can be a champion advocating for regulation
(Tamar Berman, Ministry of Health Israel)	 It seems like many of us have the same experience. People think this is an old problem, they don't realize it is still very relevant!
(Jeiel Guarino, IPEN):	 IPEN finds that the highest lead levels are in anticorrosive paints (as high as over 500,000 ppm) and for architectural paints, as high as 250,000 ppm.

Questions from presenters	Responses from participants
How do you define "industrial paint"? What applications? Have other countries looked at spray paints?	 In Tunisia, there is only testing for solvent-based household paints for all the colours. The Philippines has conducted a study on lead in spray paints in 2020: <u>https://ipen.org/documents/lead-spray-paints- consumer-use-philippines</u> Vietnam looked at industrial paints.
What is preventing progress in Senegal?	 The issue of lead paint is not taken seriously by the government. Attention to lead paint only began 2 years ago but no action has been taken by the authorities. Only PAN Africa NGO tries to raise awareness and to inform the public and media about the toxicity of lead paint.
For testing new paint with portable XRF, is it possible to paint a surface first, let it dry, and then test with portable XRF?	 When testing was done in spray paints in Israel, surfaces were sprayed and dried and tested with portable XRF.
The EPA Renovation, Repair and Painting Program (RRP) handles legacy paint - existing paint on walls. Does the mobile app work for new paint?	Not currently.
Questions from participants	Answers from presenters
Have you considered mobile applications for mapping tested results?	Mobile applications have not been used but will be investigated.
Poll 4 Results (N=13):In what kinds of paints have you found high levels ofNB Participants could only select one option•Architectural or household paint, n=2•Paint on playground equipment, n=2•Road marking paint, n=3•I don't know, n=2•Other paint (specify in chat), n=4:•Architectural paints•Household paint•Anticorrosive paints•Industrial paints	of lead? (Select all that apply)

Poll 5 Results (N=13):

What progress have you seen as a result of the testing? (Select all that apply)

- Public awareness raised, n=1
- Government buy-in to regulate lead paint, n=3
- Industry buy-in to reformulate lead paint, n=1
- Lead paint law drafted, n=2
- Lead paint law enforced, n=2
- Media attention to problem, n=1
- Have not done testing, n=3

Question 3. What methods have you used to test for lead in paint? If you have not tested, what type of methods would you consider using?

Country	Participant's responses
Iran	- In Iran, there are measurements of lead in paint by some labs, but there are still no mandatory
(Academia)	standards for lead in construction paints.
	- A lot of academic research has also been done.
Malaysia	- pXRF was used to test scraped paint and spray paint (spray-on wood-dried) and send samples to
(NGO)	the US for testing in the lab.
Senegal	- The lowest level seen in Senegal is 0.6 ppm, for decorative paint.
(Government)	
Tunisia	 Tunisia uses Inductively coupled plasma (ICP)
(Government)	
UNITED STATES OF	- Flame Atomic Absorption Spectroscopy (FAAS) may be good enough for the determination of lead
AMERICA, (USA)	in paint to 40 ppm reporting limit (no method should report zero) and is cheaper than Graphic
(International	Furnace Atomic Spectroscopy (GFAAS) and ICP-Atomic Emission Spectroscopy (AES).
Standards	 See ASTM E3193 (Standard method for Lead measurement, <u>https://www.astm.org/</u>).
Organization)	- To be accredited to analyze consumer paint in the USA, the lab shall have a reporting limit no
	greater than half of the action limit of 90 ppm; therefore, the lab shall report at 45 ppm and have a
	detection limit no greater than half the reporting limit.
	-
United States of	 The goal is to gather large data sets using smartphone devices.
America (USA)	- Smartphones account for 80% of all devices.
(Private sector)	 Smartphone Market Share - OS: <u>https://www.idc.com/promo/smartphone-market-share(May 11,</u>
	2020
	 Deep learning smartphone application for real-time detection of defects in buildings.
	- Oxford Institute for Sustainable Development, School of the Built, Environment, Oxford Brookes
	University, Oxford, UK.
Lead Exposure	- Samples of new paint (dried) are shipped to the US for analysis ICP-Optical Emission Spectroscopy
Elimination Project	(OES). Considerations are being made into whether a pXRF should be purchased to carry out
(NGO)	broader screening in the countries we work in.
lpen	 IPEN uses an accredited US lab for testing lead content in paints.
(NGO)	 The methodology labs used by IPEN use CPSC-CH-E1003-09 for lead content analysis and EPA
	7000A/3050B for sample preparation
	- In IPEN's studies, we have seen as low as 0.6 ppm (decorative paint, Senegal, 2009) and as high as
	470,000 ppm (anticorrosive paint, Cote d'Ivoire, 2017).
	 Anticorrosive paints usually have high lead content because many manufacturers use red lead or
	lead oxide.
	 In 2020, the Philippines Spray Paint Study first used XRF to test lead content, and those with
	detectable lead levels were sent to an accredited lab.
PRESENTER'S	- Academic institutions may be less interested in what is perceived as an "old" problem, not cutting
COMMENTS	edge. How can we convince them otherwise?
(Adam Kiefer, Mercer	- It seems there is an ASTM method for quality systems for portable XRF for testing in buildings and
University):	related structures: ASTM E2119-20
	- Results showed that lab results are much higher than XRF results.

Questions/Comments from participants	Responses from presenters
Are there published standard screening methods for pXRF?	For ED XRF it is ASTM F2853.
Are there any XRF technologies (e.g., HD) that don't require confirmation by lab analysis?	ASTM F 2853 Energy Dispersive XRF.
If a country can only do screen and not quantification with lab methods- would you still encourage them to start screening?	Yes, it would be helpful to gain insights into the situation. We would encourage starting with sampling solvent-based paints of red or orange color.
Can you explain the difference between ED XRF and regular XRF?	EDXRF stands for energy dispersive X-ray fluorescence. WDXRF is wavelength dispersive X-ray fluorescence. EDXRF excites all elements at once and measures the energy released by each element. EDXRF has no moving parts, is more compact, efficient, fast, and lower cost than that of WDXRF. The EDXRF instruments can be made portable and are great for non-destructive screening of lead in paints. Portable instruments can potentially be used by personnel with little training. However, EDXRF has poorer detection limits than WDXRF. WDXRF also excites all elements at once, but scans across the element's emitted wavelengths separately. WDXRF has better detection limits than EDXRF and can hold many samples but is bulky and more expensive. These instruments are not portable and are used in the laboratory by skilled personnel
Besides pXRF can you use any other type of XRF?	Instruments are typically portable or handheld XRF (EDXRF) or lab based (WDXRF). There is also a technique known as High-Definition X-Ray Fluorescence (HDXRF), which is a more accurate type of ED XRF.
FAAS methods typically go to 100 ppm, but some labs are hitting 25 ppm MDL, 50 ppm reporting limit. Is it good enough for the 90-ppm limit?	If the laboratory can demonstrate MDLs and RLs in that range, the FAAS methods (such as ASTM E3193-21) are appropriate for a 90-ppm regulatory limit.
Is there a method that could be shared that would help other labs reach lower FAAS detection limits? (USA)	The existing FAAS methods may be suitable, depending on the laboratory. The detection limit and reporting limit are performance-based metrics and are evaluated independently by each laboratory. There are many variables that can affect the detection limit, such as instrument stability, approach to instrument calibration, linear range of calibration, preparation of standards and samples, etc.

Poll 6 Results (N=14): Who conducts the lead paint analysis for your country? (Select all that apply)

- Government agency, n=7
- Commercial lab, n=5
- Academic institutions, n=2
- Civil society/non-profit organisation, n=2
- Standard institution, n=6
- Paint industry, n=1
- Entity in other country, n=2
- I don't know, n=2

Poll 7 Results (N=14):

If testing exists, what were the lead levels you have seen in new paint or paint on existing surfaces? (Select all that apply)

- Below 90 ppm, n= 9
- Above 10 000, n=8
- Below 90 and 600 ppm, n=7
- Above 600 ppm, n=7
- Other, n=2

Questions from presenters: What are the maximum levels you have seen in your country? Answers from participants: Benin above 100,000

Lead in Paint Community of Practice membership breakdown Last updated: 07/12/2021

2021 Current
membership
25 89
20 56
15 50
10 35
1 9
71 239
24 88
25 81
12 27
8 16
27
71 239
38 132
33 107
71 239
24 88 25 81 12 27 8 16 27 2 71 239 38 132 33 107 71 239

Useful resources shared in this session:

- Global Chemicals Outlook Tool I
 <u>https://www.unep.org/resources/report/global-chemicals-outlook-ii-legacies-innovative-solutions</u>
- IPEN paint testing map
 <u>https://ipen.org/projects/eliminating-lead-paint/lead-levels-paint-around-world</u>
- IPEN testing module in the UNEP Toolkit
 <u>https://wedocs.unep.org/</u>
- IPEN 2020 Global paint testing report
 <u>https://ipen.org/documents/global-lead-paint-elimination-report-2020</u>
- IPEN research on lead paint
 <u>https://ipen.org/projects/eliminating-lead-paint/ipen-research</u>
- Applicable sampling and testing methods in the Model Law (see Appendix II)
 <u>https://www.unep.org/resources/publication/model-law-and-guidance-regulating-lead-paint</u>
- UNEP lead in paint laboratory database
 <u>https://saicmknowledge.org/library/lead-paint-laboratory-database</u>
- WHO Brief guide to analytical methods for measuring lead in paint, 2nd ed https://www.who.int/publications/i/item/9789240006058

LiP CoP: The Secretariat of the Strategic Approach to International Chemicals Management (SAICM) and the Environmental Health Division at the University of Cape Town (UCT) created this Community of Practice (CoP) to foster online discussions and address key issues on Lead in Paint (LiP) among stakeholders from governments, international organizations, industry, academia and civil society.

This CoP is contributing to the SAICM/GEF project on Emerging Chemicals Policy Issues Knowledge Management Component. This activity is supported by the Global Environment Facility (GEF) project ID: 9771 on *Global Best Practices on Emerging Chemical Policy Issues of Concern under the Strategic Approach to International Chemicals Management (SAICM).*

If you have any question or require clarification on this initiative, please contact the SAICM Secretariat at saicm.chemicals@un.org or UCT at uctcops@outlook.com.

Join the LiP CoP at: https://saicmknowledge.org/community