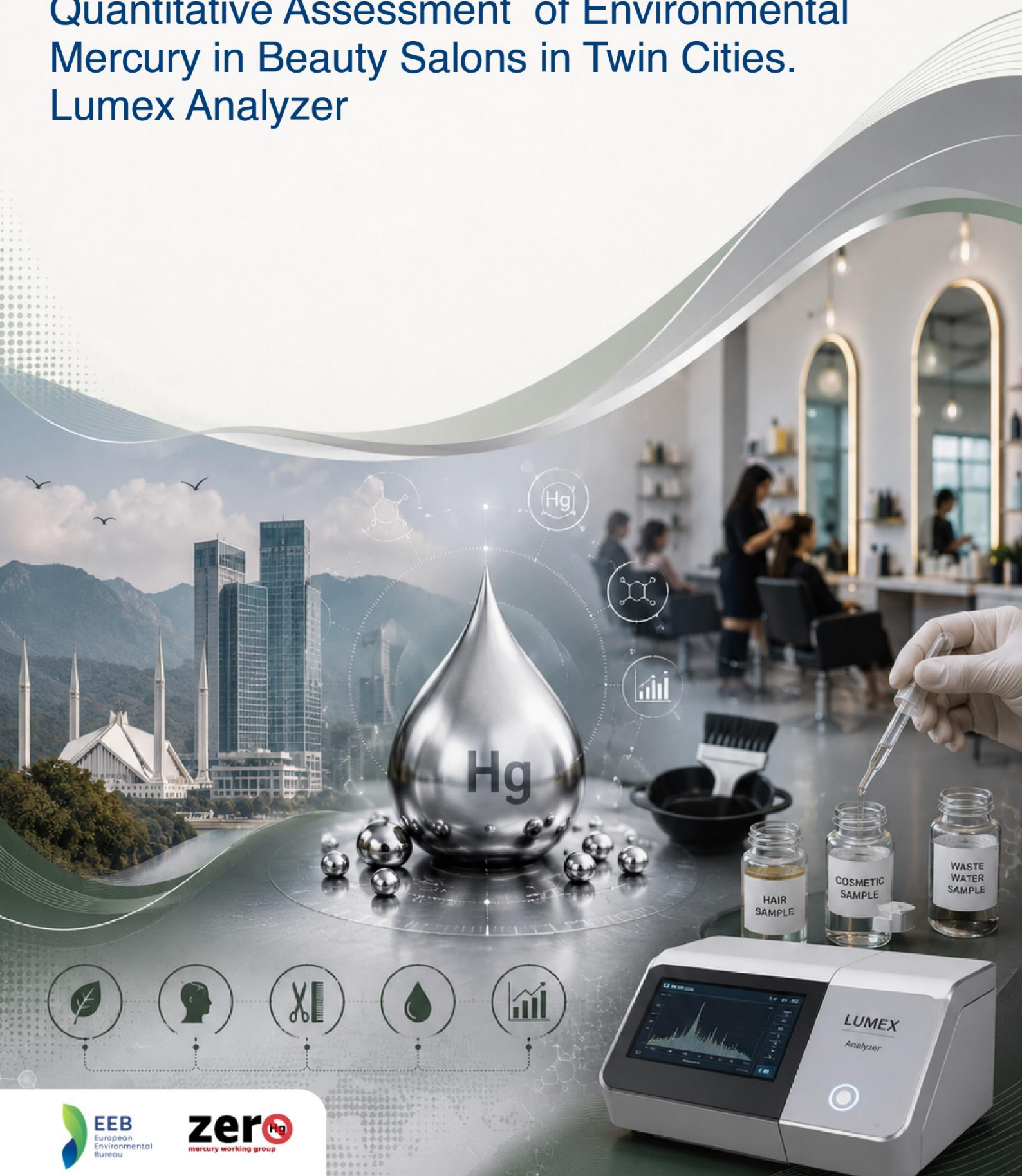


Environment Matters:

Quantitative Assessment of Environmental Mercury in Beauty Salons in Twin Cities. Lumex Analyzer



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This is a publication of the Sustainable Development Policy Institute (SDPI), an independent, non-profit research institute working on sustainable development.

First Edition: July 2026

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Acknowledgements

This survey and the preparation of this report were undertaken with financial support provided through the European Environmental Bureau (EEB) and the Swedish Society for Nature Conservation (SSNC). Technical support from the Zero Mercury Working Group was instrumental in the design and development of the survey and survey tool. SDPI acknowledges the cooperation Women Chamber of Commerce, Social Security Islamabad , Employment Old age Benefit Institution . Participants owners, managers & staff of Beauty Salons.

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Disclaimer

SDPI acknowledges financial support by the Swedish public development co-operation aid through the Swedish Society for Nature Conservation (SSNC) and the European Commission via the European Environmental Bureau (EEB) for this work and report. The sole responsibility for the content of this document lies with SDPI. The EEB, SSNC and the European Commission are not responsible for any use that may be made of information contained therein.

Executive Summary

The presence of mercury in skin whitening creams and other cosmetics in Pakistan is a critical issue and poses a significant health risk to the consumers and health and beauty professionals using them. This study investigates the indoor air quality of beauty salons in Islamabad and Rawalpindi, focusing specifically on mercury contamination resulting from the use of mercury added skin-whitening creams (Hg/SWC). Beauty salons form a large segment of the service sector, yet the environmental health risks within these spaces, particularly those associated with mercury exposure, remain largely unexamined.

Using a portable Lumex mercury analyzer, indoor and outdoor mercury concentrations were measured in various salons located in both residential and commercial areas.

Mercury was detected in the air, indicating some source of mercury; indoors very likely, due to mercury added creams used. The data collected found indoor emissions reaching over 600 and 900 ng/m³, confirming significant air quality concerns within the beauty parlors, and with mercury exceeding the EPA reference concentration of 300 ng/m³ for inhalation exposure to mercury. This significant disparity confirms the presence of an internal source of mercury vapour. The analysis highlighted significant variations in indoor mercury levels, largely influenced by salon ventilation, room layout, product storage practices, and the brands of cosmetic products used. The findings revealed that indoor mercury concentrations were significantly higher in poorly ventilated salons, particularly those located in basements or enclosed commercial spaces. Ventilation quality emerged as the most critical factor affecting indoor air quality, with salons featuring open windows, exhaust systems, or ground-floor layouts showing markedly lower mercury levels. Even well-equipped, top-tier salons with dedicated treatment rooms recorded elevated mercury levels in enclosed spaces due to limited airflow.

Given that no other source than the treatment products used could be identified, the study found some correlation between specific cosmetic brands used, such as Janssen, Dermacos, and Thalgo, and the reported higher mercury concentrations in the air. Testing those creams would be necessary. In contrast, the placement of products, whether in jars or bottles near customer seating areas, had a minimal impact when compared to ventilation and room design.

Most salon staff and owners demonstrated awareness of the health risks associated with mercury-based products and often informed clients about potential side effects, though these efforts were not always supported by adequate infrastructure. Furthermore, the study observed that ventilation systems may contribute to increased outdoor mercury levels by expelling contaminated indoor air.

Overall, the research underscores the urgent need for regulatory action on the manufacturing of mercury added creams. This would need to be accompanied by stricter oversight of cosmetic products, training of beauty salons staff to avoid products suspect to contain mercury and other hazardous chemicals, mandatory ventilation standards, regular indoor air quality assessments, and public awareness and training initiatives to mitigate health risks in Pakistan's growing beauty industry.

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Background

The demand for beauty parlors has been rising as the number of people has improved lifestyle and greater health and grooming awareness is growing. In the past, beauty parlors and spas were mostly focused on women but in recent times this sector is also paying closer attention to men¹. The most sought out services are hair styling, skin care, makeup and manicure / pedicure; however, wellness SPAs and other relieving therapies cannot be ignored.

The Cosmetics and beauty Industry in Pakistan has grown considerably in the last few years. It plays a vital role in the economy, providing employment opportunities and contributing to the country's GDP². Despite facing economic challenges such as inflationary pressures, beauty and personal care in Pakistan witnessed robust growth in 2023³. This growth was fueled by resilient consumer spending driven by a heightened awareness of health and wellness. Pakistani consumers exhibited a growing demand for skin care, hair care, and hygiene products, prompting brands to innovate and adapt to evolving preferences.

Mercury has been identified as a toxic element frequently used in skin-whitening products for its melanin-inhibiting properties. Prolonged exposure to mercury can lead to dermatological, renal, neurological, and reproductive health problems. Beauty parlors play a central role in the application and promotion of such products, often serving a diverse business with varying preferences and expectations. Many parlors operate in confined spaces, often with limited ventilation and substandard environmental controls, which may lead to the accumulation of harmful vapors, including mercury, in indoor environments. This presents health risks not only for clients but also for salon workers who are exposed to these substances daily.

With the continued growth of the beauty and personal care sector, there is an increasing need to promote a safe and healthy environment within beauty salons. SDPI with support of the Zero Mercury Working Group/European Environment Bureau has taken this responsibility to highlight this critical issue, with the aim of local evidence generation, fostering awareness, addressing challenges, and proposing actionable recommendations to ensure the well-being of both salon employees and clients. To this end, SDPI organized a roundtable discussion (16th April 2025) to engage key stakeholders – beauty salon managers /owners on one hand and government and regulatory bodies representatives on the other hand, to explore the main issues of this industry, such as regulatory barriers, taxation, trained workforce, environmental contamination due to cosmetics containing hazardous chemicals. The second activity was evidence generation for environmental mercury contamination through a market survey and quantitative measurement of mercury contamination in indoor environment of the beauty parlors, using a LUMEX instrument.

The present study was conducted to assess indoor mercury levels of parlors in Islamabad and Rawalpindi, with a focus on identifying the presence of mercury, ventilation conditions, product usage, salon layout, and awareness among staff regarding chemical safety. Through environmental monitoring and observational analysis, the study aimed to identify key factors contributing to elevated mercury concentrations in salon environments.

¹ <https://www.sbp.org.pk/departments/ihfd/Sub-Segment%20Booklets/Beauty%20Parlors%20and%20Spas.pdf>

² https://lcci.com.pk/ECONOMIC_OUTLOOK.pdf

³ https://www.researchandmarkets.com/reports/2306170/beauty_and_personal_care_in_pakistan?srsId=AfmBOoqxnuWHuIExM_iK7aVBPr70-loAT11yOswuGJPV08oVlp-N_yaG

1. Introduction

2.1 Indoor Air Pollution and Mercury Exposure from Skin Whitening Creams in Beauty Salons

Indoor air pollution is considered one of the top five environmental risks to public health. On average, people spend nearly 90% of their time indoors, whether in residential or occupational settings, where pollutant levels can range from 2 to 5 times higher than those outdoors. In certain cases, human exposure to indoor air pollutants may exceed outdoor levels by more than 100-fold⁴.

One overlooked but significant source of indoor air pollution is beauty salons. These establishments provide a wide range of cosmetology services, including facial treatments, skin whitening, artificial nails, hairstyling, shampooing, coloring, highlighting, and hair straightening. To deliver these services, a variety of cosmetic products are used, many of which contain volatile organic compounds (VOCs) and other hazardous chemicals. Common ingredients include aromatic hydrocarbons, esters, ketones, and heavy metals such as mercury, which pose potential risks to both human health and the indoor environment.

Among these products, Skin Whitening Creams (SWCs) have raised particular concern due to their widespread use and toxic chemical composition. Mercury, often added to these creams as a skin-lightening agent, is of specific environmental and health concern. These creams are marketed to promote a fairer skin tone but are frequently found to contain mercury concentrations that exceed regulatory limits, thus posing long-term risks to both users and the ecosystem. The manufacture, storage, import and sale of mercury-added cosmetics are banned in Pakistan according to the Pakistan Standard on Skin Creams (PS: 3228/2017)⁵. Under the Minamata Convention on mercury such products are banned from manufacture, import and export, but can still be found globally, as investigations from the ZMWG reveal⁶.

The use of mercury-added SWCs in beauty salons intensifies the problem. Salon personnel and customers are exposed through dermal absorption and inhalation of vapours. Furthermore, improper disposal of these products contributes to environmental mercury pollution. The continued use and commercial availability of such creams remain a global public health and environmental issue, drawing increasing scrutiny from international regulatory bodies and civil society.

Recognizing this challenge, the Sustainable Development Policy Institute (SDPI), with its longstanding commitment to mercury phase-out initiatives, has taken an active role in addressing this issue. Leveraging its technical expertise in mercury analysis, experience in community engagement, and policy advocacy, SDPI contributes to this field by translating research into actionable policy recommendations.

This survey report, developed as part of SDPI's broader efforts, seeks to:

- Raise awareness about mercury exposure resulting from the use of skin whitening creams in commercial beauty salons,
- Highlight the environmental and health risks posed by mercury-containing cosmetics;
- Propose solutions to mitigate these impacts, emphasizing awareness-raising, regulatory enforcement, and industry accountability.

⁴ <https://www.epa.gov/indoor-air-quality-iaq/inside-story-guide-indoor-air-quality>

⁵ <https://psqca.com.pk/cs/Chemical/PS%203228-2017.pdf>

⁶ www.zeromercury.org/mercury-added-skin-lightening-creams-campaign/

By investigating the commercial use of mercury-based SWCs in salons, this study aims to support the development of effective policy interventions and promote safer alternatives in the beauty industry. The findings are expected to inform regulatory frameworks, foster behavioural change among consumers, and encourage better compliance from industry stakeholders regarding toxic ingredients.

2.2 Literature Review

The health risks associated with mercury in closed environments are not limited to exposure from SWCs.

Agocs (1990) conducted a study to examine the health risks associated with mercury-containing indoor paints, focusing specifically on phenylmercuric acetate (PMA), a preservative used to prolong the shelf life of latex paints. The study revealed that individuals living in homes recently painted with PMA-containing paint measured to have mercury levels as high as 4.7 mmol/L, far exceeding the EPA's recommended limit of 1.5 mmol/L were exposed to significantly elevated levels of indoor-air mercury. Among 74 residents from 19 such homes, the median mercury concentration in the air was 10.0 nmol/m³, and urinary mercury levels reached a median of 4.7 nmol/mmol creatinine, compared to only 1.1 nmol/mmol in the control group. These values overlapped with levels associated with mercury poisoning symptoms, such as acrodynia in children. The findings confirmed that the use of mercury-based paints substantially increases the risk of mercury vapor exposure and systemic absorption, especially in closed environments. The study concluded that strict regulatory action and heightened public awareness are essential to minimize health risks from mercury-containing household products⁷ (Agocs et al., 1990).

The presence of inorganic mercury compounds (typically 1–10% ammoniated mercury) in SWCs works by inhibiting melanin production, but also introduces substantial risks of skin damage, nephrotoxicity, neurotoxicity, and environmental contamination. These evidence-based findings emphasize the urgent need for policy intervention, awareness campaigns, and the enforcement of mercury-specific legislation to protect consumers from chronic mercury exposure via cosmetic products. (Bushra Afzal, 2018) reference in the comprehensive review by Narayanan et al. (2024), the widespread use of mercury-added skin-whitening creams is highlighted as a growing nephrotoxic threat, particularly relevant to indoor environments such as salons.

Despite global regulatory efforts, these products remain prevalent and pose serious health risks through chronic dermal exposure, especially in enclosed settings like beauty parlors. Barr et al. (1972) first reported a link between mercury-laden creams and nephrotic syndrome, a finding that has since been supported by several case series and histopathological studies (Qin et al., 2022; Gao et al., 2020). The kidneys are particularly susceptible, with membranous glomerulonephritis (MGN) and minimal change disease (MCD) being the most reported pathologies associated with such exposure. Furthermore, Narayanan et al. documented mercury levels in fairness creams exceeding WHO's permissible limits by over 10,000-fold, underlining the risk not only to users but to those occupationally exposed in indoor environments. The study stresses that mercury vapor from these products may also contaminate indoor air, increasing the risk of both renal and neurological damage among salon workers and clients. These findings underscore the urgent need for regulatory enforcement,

⁷ <https://pubmed.ncbi.nlm.nih.gov/2215577/>

routine screening, and public health awareness in cosmetic and salon settings⁸ (Meena et al., 2024).

Mercury is intentionally added to cosmetics, particularly skin-lightening creams and eye makeup, despite its known toxicity and legal restrictions. For example, Mohammed et al. (2024) reported Hg levels ranging from 0.294 to 14,414.5 mg/kg in various creams, with only 3 out of 19 tested products being Hg-free, and some manufacturers failing to declare Hg on product labels. Similarly, Gyamfi et al. (2023) and Parmar & Patel (2024) found alarmingly high Hg levels in eye liners, lipsticks, and face powders, in some cases up to 181 mg/kg, far exceeding international safety thresholds (e.g., 1 ppm by FDA standards). Continuous use of such products can result in mercury accumulation in the body, leading to systemic toxicity. Despite regulations, these findings underscore a gap in enforcement and highlight the urgent need for stricter monitoring of cosmetic products to prevent chronic exposure and protect public health⁹ (Fischer et al., 2025)

2.3 Permissible limit

Information on the limits of mercury in indoor air, assuring safe health, differ from one agency to other and between countries or US states. A few references are provided below to allow for discussion vis a vis our findings:

The Environmental Protection Agency (EPA), in 2003, sets a reference concentration of 0.3 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) for inhalation exposure to mercury. This reference concentration serves as a screening guideline to help risk assessors prioritize investigations into potentially hazardous mercury exposures; it does not mean that adverse health effects will necessarily occur at this level. For instance, if mercury levels of $0.3 \mu\text{g}/\text{m}^3$ ($300 \text{ ng}/\text{m}^3$) are detected inside a building's air, the EPA recommends further examination of the exposure to assess potential risks. Similarly, the Agency for Toxic Substances and Disease Registry (ATSDR) has set a minimal risk level (MRL) for inhalation exposure at $0.2 \mu\text{g}/\text{m}^3$ ($200 \text{ ng}/\text{m}^3$). The MRL is an estimate of the daily human exposure to a hazardous substance that is likely to be without appreciable risk of adverse health effects over a specified period of time. ATSDR also recommends an action level of $1.0 \mu\text{g}/\text{m}^3$, which triggers remediation if exceeded in indoor air¹⁰.

The New York State, Department of Health referred to the following health based guidance values (air concentrations for Mercury vapor¹¹:

8

https://www.researchgate.net/publication/386014972_Snow_White_tale_in_nephrology_the_emergin_g_threat_of_skin_whitening_creams_on_Kidney_Health

⁹ <https://www.mdpi.com/2305-6304/13/6/507>

¹⁰ <https://archive.epa.gov/airquality/community/web/pdf/mercuryindoor.pdf>

¹¹

https://www.health.ny.gov/environmental/chemicals/mercury/docs/air_concentrations_vapor.pdf

Health-based Guidance Values (Air Concentrations) for Mercury Vapor

Type of Value	Agency (Date)	Value	Exposure
Occupational Standard or Guideline			
<i>Regulation-PEL</i> ¹	OSHA ² (1976)	100 mcg/m ³	8-Hour TWA ³
<i>Guideline-REL</i> ⁴	NIOSH ⁵ (1973)	50 mcg/m ³	10-Hour TWA
<i>Guideline-TLV</i> ⁶	ACGIH ⁷ (1991)	25 mcg/m ³	8-Hour TWA
Non-Occupational Guideline			
<i>Minimal Risk Level (MRL)</i> ⁸	ATSDR ⁹ (1999)	0.2 mcg/m ³	Chronic inhalation
<i>Reference Concentration (RfC)</i> ¹⁰	US EPA ¹¹ (1995)	0.3 mcg/m ³	Chronic inhalation
<i>Chronic CA REL</i> ¹²	CA EPA ¹³ (2008)	0.03 mcg/m ³	Chronic inhalation
<i>8-Hour CA REL</i> ¹⁴	CA EPA (2008)	0.06 mcg/m ³	Intermittent 8-Hour inhalation
<i>Acute CA REL</i> ¹⁵	CA EPA (2008)	0.6 mcg/m ³	Intermittent 1-Hour inhalation

mcg/m³: microgram mercury per cubic meter of air.

1 milligram (mg) = 1,000 micrograms (mcg) = 1,000,000 nanograms (ng)

1. A Permissible Exposure Limit (PEL) must not be exceeded during any 8-hour workshift of a 40 hour work week.
2. Occupational Safety and Health Administration (OSHA)
3. Time Weighted Average (TWA): the air concentration averaged over a specific period of time.
4. Recommended Exposure Limit (REL): average air concentration for a 10-hour workday.
5. National Institute for Occupational Safety and Health (NIOSH)
6. Threshold Limit Value (TLV): the air concentration that nearly all workers may routinely be exposed to during 8-hour workdays of a 40 hour work week without having adverse health effects.
7. American Conference of Governmental Industrial Hygienists (ACGIH)
8. A Minimal Risk Level (MRL) is an estimate of daily human exposure to a hazardous substance that is likely to be without an appreciable risk of adverse, non-cancer health effects over a specified route and duration of exposure.
9. Agency for Toxic Substances and Disease Registry
10. A Reference Concentration (RfC) is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure of the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.
11. United States Environmental Protection Agency
12. A Chronic CA REL (California Reference Exposure Level) is a concentration at or below which adverse health effects are not likely to occur in the general human population exposed continuously over a lifetime.
[http://www.oehha.ca.gov/air/hot_spots/2008/NoncancerTSD_final.pdf]
13. California Environmental Protection Agency
14. An 8-hour CA REL is a concentration at or below which adverse health effects are not likely to occur in the general human population with intermittent exposures of eight hours per day, up to 7 days per week.
15. An Acute CA REL is an exposure that is not likely to cause adverse effects in a human population, including sensitive subgroups (such as infants and children), exposed to that concentration for one hour on an intermittent basis.

2. Objectives

The objectives of the study are:

- To raise awareness about the environmental and health hazards of mercury-added skin whitening creams.
- To investigate the role of beauty salons in commercial exposure to these products.
- To highlight the risks posed to both salon workers and customers.
- To propose solutions to mitigate mercury exposure and reduce environmental pollution, including awareness campaigns and policy recommendations.

3. Methodology

The study is designed to conduct surveys and interviews with beauty parlor owners and workers to gather information on the types of beauty products used, sources of procurement, and their awareness of the mercury ban. The indoor air in beauty parlors was tested by using the EEB/ZMWG owned Lumex RA 915+ mercury analyzer. Similarly, mercury was also measured outside the parlors in the open air using the same device. Exploratory Data analysis is presented in the form of tables and association /relationship between independent variables and dependent variables was analyzed by crosstabs utilizing the averages and creating dummy variables.

Survey Date and Time

The survey was conducted on April 17th to- 19th , 2025.

Study Area

Ten beauty parlors of Rawalpindi and Islamabad were selected for survey. Beauty parlors were selected in areas of upper , middle & lower socio economic status with both gender representation and were willing to participate. Ethical consent was taken from the owner of each beauty parlor before the analysis.

The Lumex analyzer was used to detect mercury levels in environment according to the shared protocols established by the EEB and SDPI. The detailed protocol is attached (Annexure A) The operator of the analyzer was trained by experts, and practice was done before going to the field. The instrument was checked and calibrated as per instruction manual and protocol.

4. Discussion with Owners of the Beauty parlors

Environment, Health and Sustainability Policy

Discussions were conducted individually with the owners of each beauty parlor visited, focusing on their policies related to environmental sustainability, health, and safety. During these interactions, both salon owners and staff were questioned regarding their awareness of the health risks associated with the use of chemical-based skin creams.

It was observed that many respondents demonstrated a considerable awareness of the potential health hazards posed by the chemicals found in skincare products, particularly skin-whitening and lightening agents. However, their understanding of the environmental impacts of these products appeared to be limited.

Furthermore, it was reported that certain products, such as hair dyes, emit strong odors that can lead to respiratory issues, including sinus problems and allergic reactions. As a precautionary measure, it is common practice among the salons to keep doors and windows open during such treatments to ensure adequate ventilation and wearing of masks to reduce associated health risks.

Awareness about Mercury

During the discussion the dangerous effects of mercury and other chemicals were discussed. It was informed that the use of hazardous chemicals in beauty treatments poses serious health risks, particularly for vulnerable groups such as pregnant women. One of the most dangerous substances commonly found in some cosmetic products is mercury, which can have severe effects on maternal and fetal health. Harmful substances frequently used in salons include lead, found in certain hair dyes, which have been linked to developmental delays and cognitive issues in children. Skin polishing treatments and instant whitening creams, though still in demand, are known to carry long-term health risks. Furthermore, poor ventilation in many beauty parlors increases the risk of inhaling harmful fumes, for salon staff who are more exposed to those chemicals fumes daily. These fumes are harmful for clients as well. The critical nature of maternal health, particularly in the early and late stages of pregnancy, makes it essential for pregnant women to avoid all forms of chemical-based beauty treatments during these periods. Salons staff should inquire about clients' medical conditions or sensitivities before proceeding with treatments, while standardization of such practices is still lacking.

5. Results and Discussion

6.1 Mercury detection results

The discussion below focuses on the indoor and outdoor environmental mercury levels measured across the surveyed parlors. All beauty parlors visited offered skin whitening services. An overview of the brands found in each parlor is available in table 15. A detailed overview of the findings of the survey in each parlor is available in [Annexure C](#).

Table 1: Mercury detection in beauty parlors

Parlor	Indoor Mercury Level (ng/m ³)			Comments
	Outdoor Mercury Level (ng/m ³)	Treatment Room 1 (TR 1)	Treatment Room 2 (TR2) (if available)	
Parlor A	71.5	631		>ASTDR 200 ng/m ³ and EPA 300 ng/m ³
Parlor B	7	13.5	191	Close to ASTDR 200 ng/m ³
Parlor C	3	380	964	>ASTDR 200 ng/m ³ and EPA 300 ng/m ³
Parlor D	17.67	7.3	84.3	>CA EPA 60 ng/m ³
Parlor E	71.3	103.3		>CA EPA 60 ng/m ³
Parlor F	34.3	8.3		

Parlor G (Men)	8.33	8.7	
Parlor H (Men)	1	18	
Parlor I	8.67	367.3	>ASTDR 200 ng/m ³ and EPA 300 ng/m ³
Parlor J	8.67	13.3	27.3

Mercury was detected in all ten beauty parlors surveyed, with indoor concentrations varying strongly both within and across establishments. As shown in Table 1, outdoor mercury levels ranged from as low as 1 ng/m³ (parlor H (Men) to 71.5 ng/m³ (Parlor A). Given, that ambient air mercury concentrations in natural, unpolluted environments are typically very low, generally ranging from 1 to 4 nanograms per cubic meter¹² , the outdoor mercury levels of A and E parlors, raises significant concerns.

Indoor levels, particularly in treatment rooms where skin whitening and facial services are actively performed, reached considerably higher concentrations in several parlors, reaching up to 964ng/m³.

Considering the above-mentioned references, the EPA recommends further examination of the exposure if reference concentration of 300 ng/m³ for inhalation exposure to mercury is exceeded. Similarly the ATSDR minimal risk level (MRL) of 200ng/ m³ estimates that such daily human exposure is likely to be without appreciable risk of adverse effects over a specific period of time. ATSDR also recommends an action level of 1.0 µg/m³ , which triggers remediation if exceeded in indoor air. Considering the EPA reference concentration of 300 ng/m³ as a comparison for inhalation exposure concern, indoor mercury levels exceeded this threshold in three parlors: Parlor A (631 ng/m³, TR1), parlor C (380 ng/m³ in TR1 and 964 ng/m³ in TR2), and parlor I & Academy (367.3 ng/m³, TR1). Parlor C recorded the highest single indoor reading across the entire survey at 964 ng/m³ in its facial treatment room: more than three times the reference level. The parlor B recorded levels right under the ATSDR MRL level. Two more Beauty Salons, the parlor D and E showed concentrations above the California EPA Reference Exposure Level (REL) of 60 ng/m³, at or below which adverse health effects are not likely to occur in the general human population with intermittent exposures of eight hours per day, up to 7 days per week.

These findings indicate a potentially significant inhalation exposure risk for both workers and clients in these establishments, particularly during treatment sessions. Several parlors recorded indoor mercury levels that, while below the threshold, were still notable, suggesting indoor mercury exposure.

Considering that no other potential source of mercury was identified, based on the recognized occupational hazards in the beauty industry, the primary and major source of mercury is likely to be the use of mercury added skin whitening creams in the beauty salons.

6.2 Factors associated with environmental Mercury Concentration

Ventilation of the rooms, a strong determinant of mercury levels

¹²

[https://pmc.ncbi.nlm.nih.gov/articles/PMC3514463/#:~:text=Among%20mercury%20species%2C%20elemental%20mercury,4%20cm%20s%2D1\).](https://pmc.ncbi.nlm.nih.gov/articles/PMC3514463/#:~:text=Among%20mercury%20species%2C%20elemental%20mercury,4%20cm%20s%2D1).)

As shown in table 2, mercury concentration in the environment is high in areas lacking a proper ventilation system. The ventilation system includes the presence of an exhaust system, an air conditioning system, and open windows. High mercury concentration was observed mostly in small beauty parlors. Additionally, a high mercury concentration was observed in the treatment room even when the windows were open. Conversely, mercury concentration is low in parlors with a good ventilation system.

Table 2: Relationship between Mercury Level and Ventilation

Beauty Parlor	Ventilation	Indoor Level Room 1	Mercury Treatment	Indoor Level Room 2	Mercury Treatment	Outdoor Mercury Level
Parlor A	No	631				71.5
Parlor C	Ventilated but windows are closed	380		964		3
Parlor I	No	367.3				8.67

For example, the Parlor **A**, located in a small, poorly ventilated basement shop in Ghori Town, Islamabad, has reported high indoor mercury levels (TR1: 631 ng/m³) if compared to the Parlor **B**. The latter, situated opposite to the parlor **A** in the same commercial area is more open and better ventilated, exhibiting significantly lower mercury levels even in the closed room (TR1: 13.5 ng/m³; TR2: 191 ng/m³), despite using similar cosmetic products.

Salons with dedicated rooms for different services, such as parlor **C** and **D** Beauty Salon, showed varied results. Although these establishments are top-tier and generally well-ventilated, high mercury concentrations were recorded in their treatment rooms (**C** TR2: 964 ng/m³). This may be due to the enclosed nature of these spaces, reduced airflow, and the types of treatments ran therein. These findings suggest that even in well-equipped salons, inadequate ventilation in inner treatment rooms can contribute to hazardous indoor air quality.

Moreover, the place of SWPs near the sitting area does not directly impact on the salon staff or customer unless it is in use or jars or bottles are open.

Salons with high mercury levels indoors generally exhibit low concentrations outside, as illustrated in figure 2. Those with proper ventilation, such as **J**, **G** , **B** , and **D** beauty salons, show balanced mercury levels both inside and outside the premises. Treatment rooms consistently display elevated mercury concentrations compared to other areas. This pattern suggests that adequate ventilation plays a crucial role in maintaining safer mercury levels, reducing indoor accumulation, and equalizing indoor and outdoor mercury presence. The outdoor mercury levels appeared to be somewhat influenced by the presence of ventilation systems or air conditioning. Unexpectedly, locations with ventilation systems recorded little higher outdoor mercury levels, possibly due to the ejection of contaminated indoor air into the surrounding environment.

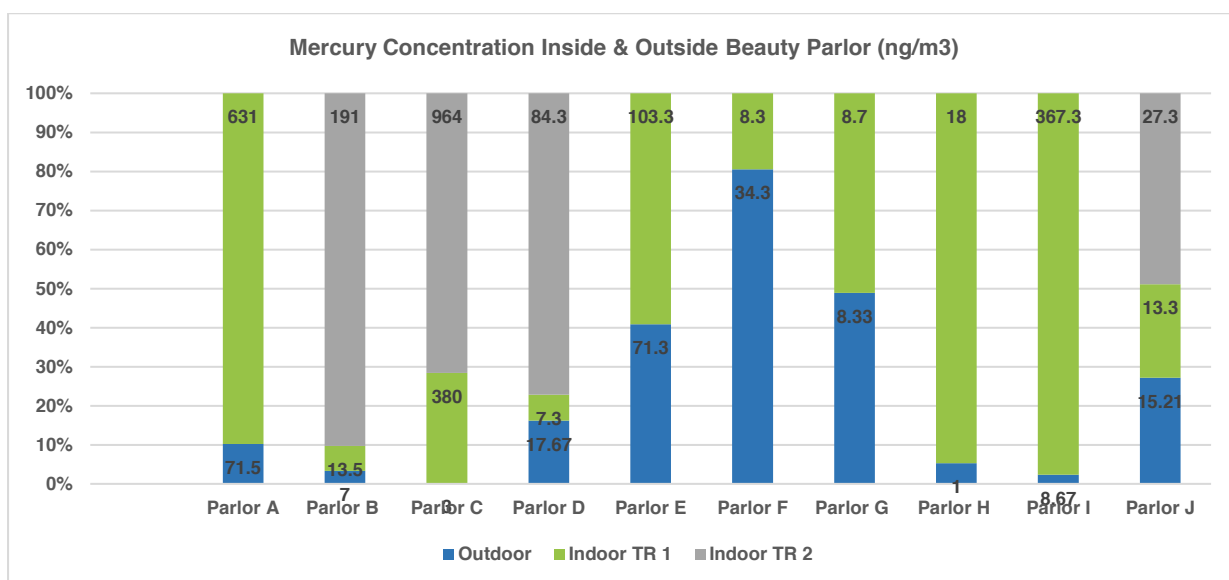


Figure 1: Mercury Concentration Inside & Outside Beauty Parlor (ng/m3)

Brand of Products Used and Indoor Mercury Levels

As discussed above, the mercury emissions recorded within the beauty salons are most likely to come from the treatment cosmetic products used.

Table 15 shows various brands of SWCs that are commonly utilized in beauty parlors, depending on customer preferences and the range of services provided. The data indicates that, on average, mercury concentrations in the indoor environment tend to be higher in salons where Janssen and Dermacos cosmetic products are more frequently used, followed by those using Thalgo cosmetics.

Data revealed that almost similar products are being used in each parlor, but high mercury concentration is only shown in the parlors with low or no ventilation. This shows that the amount of mercury is more likely to be coming from the brands of creams they are using that effect.

Table 33: Brands of Skin Lightening Products and Average Indoor mercury Level

Parlors	Brand of SLPs	Indoor Level TR 1	Mercury	Indoor Level TR 2
Parlor A	Jensons, Dermacos, Thalgo	631		
Parlor B	Janssons/ Dermalogica/ Hydra/ Loreal	13.5		191
Parlor C¹³	Jensons	380		964
Parlor D	Jensons, Thalgo	7.3		84.3
Parlor E	Jensons, Thalgo	103.3		
Parlor F	Dermacos, jensons	8.3		
Parlor G	Dermacos, Dr. Derma	8.7		
Parlor H	Dermacos, Dr. Derma	18		
Parlor I	Dermacos, Jensons, Hilift	367.3		

¹³ Regarding Parlor C, it is possible that other brands of skin lightening products were available, based on the pictures that have been taken by the survey team, however only the name of the Jensons brand has been shared by the Parlor.

Parlor J	Jensons, Thalgo	13.3	27.3
-----------------	-----------------	------	------

While no other source of mercury could be detected, none of the brands used have been identified in the ZMWG, CA, NY, MN State or other publicly available databases of tested mercury-containing cosmetics, with the exception of one Dermacos product (Drm4 - Miracle Lightening Cream) in the ZMWG database, where one sample was tested in 2017 with a recorded mercury concentration of 1.72×10^{-6} .

To that end the potential mercury content of these products should be verified.

Awareness and risk mitigation

An important finding is the awareness level among salon owners and staff. Across nearly all establishments, there was a clear understanding of the potential health risks associated with mercury in cosmetic products, and clients were generally informed about potential side effects prior to treatment. However, risk mitigation strategies varied, with some salons adhering to strict storage and ventilation protocols, while others lacked infrastructure to fully minimize exposure risks.

Conclusion

Mercury emissions have been identified in all beauty salons sampled, showing that there is a source of mercury. Given the nature of services provided, mercury-added skin-whitening creams (SWCs) are the most probable origin. The use of such products is not only potentially affecting the skin and health of the customers but is also affecting the indoor environment of the salons, creating significant public and occupational health risks for both workers and customers.

The results have revealed that mercury level in indoor environment varies considerably depending on the salon's infrastructure, ventilation, storage practices of the products, and the brands of products used. Parlors which lack adequate ventilation systems such as those situated in basements or enclosed commercial settings showed slightly higher indoor mercury levels, especially in treatment rooms where services are frequently provided. The data further indicated that certain cosmetic brands, particularly Janssen, Dermacos, and Thalgo, were most likely associated with (elevated) environmental mercury concentrations, suggesting potentially a direct link between product composition and indoor air contamination. Products were however not tested under this study, and this should be verified.

Salon owners and staff appeared to be aware of overall health risks potentially linked to these products and took steps to protect clients, such as giving safety information and asking about allergies. However, these efforts were somehow limited. It is clear that more awareness is necessary concerning the problematic products potentially containing mercury being used.

Overall, the study underscores the urgent need for comprehensive regulatory oversight, including stricter enforcement of the manufacturing ban of mercury-added cosmetics, of the product safety standards, mandatory environmental controls within salons, and routine air quality assessments, and public awareness campaigns and professional training for salon workers. Addressing these issues is essential to protect the health of both salon employees and clients, and to ensure safer cosmetic service environments in Pakistan's growing beauty industry.

Recommendations

Based on the findings of this study, the following recommendations are proposed to reduce mercury exposure in beauty parlors and ensure safer working and service environments:

1. Regulate Manufacture, trade and sale of Mercury-added Cosmetics
 - Authorities should enforce the ban of mercury added cosmetics which are being manufactured in Pakistan.
 - Authorities should publish a list of prohibited SWCs, and regularly monitor and update it. regulate the sale and use of cosmetic products, especially those containing mercury.
 - Measures need to be taken ensuring that liability for importers and distributors in local markets are the same as for those selling via online marketplaces.
2. Proper Ventilation Systems
 - Beauty salons should respect hygiene and exposure standards. To that effect elements such as proper ventilation, including windows, exhaust fans, and air circulation systems, especially in treatment rooms where chemical products may be used, should be taken into consideration.
3. Increase Awareness and Training
 - Regular health and safety training should be provided to salon owners, managers and staff to raise awareness about the risks of mercury and other harmful chemicals.
 - Salons should continue informing clients about possible side effects and checking for allergies before any treatment.
4. Implement Routine Environmental Monitoring
 - Indoor air quality in salons should be checked regularly, especially in closed or poorly ventilated spaces, to monitor mercury levels and take timely action.
5. Promote safe products
 - Beauty parlors, should be informed to ensure that products used will not cause harm to their clients.
 - Salon owners should be encouraged to buy products from verified suppliers or official company websites to ensure product authenticity and safety.
6. Policy and Regulatory Action
 - Legislate and set the standards for environmental mercury concentration in Beauty salons.
 - Local health and environmental authorities should develop clear guidelines for the safe operation of beauty salons, including permissible mercury limits and ventilation requirements.
 - Compliance checks should be conducted routinely to ensure salons meet health and safety standards.

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Annexures

Annexure A – Protocol: Using the Lumex RA915+ in Beauty Parlours

The lumex activity was performed according to the shared protocols by EEB.

This protocol provided step-by-step guidance on how to use the Lumex device for mercury detection in beauty parlours in Pakistan. The goal was to collect consistent and reliable data for reporting.

1. Information about the parlour (before or during the visit)
 - a. Document the name and location of the beauty parlor.
 - b. Identify the services offered, particularly whether skin-whitening treatments are provided.
 - c. Identify the general policy of the parlour in terms of skin whitening, health, environment, sustainability
2. Initial Outdoor Measurement
 - a. The Lumex device was on at least 20-30minutes before starting the measurements
 - b. Hold the Lumex device hose between hip and shoulder level
 - c. Taken a readings outside the parlour, near the entrance.
 - d. Taken a picture of the result of the reading
 - e. Taken a picture of the colleague doing the measurement, with the Lumex.
 - f. Note any signs of external mercury contamination
 - g. Taken a picture of the front of the shop

3. Engaging with Staff for Awareness and Information

Discussion with the staff:

- a. Who to talk to: Note whether you speak to the receptionist, manager, or service providers.
- b. Information about the parlour (if not in advance):
 - i. Document the name and location of the beauty parlour
 - ii. Identify the services offered, particularly whether skin-whitening treatments are provided

- iii. Identify the general policy of the parlour in terms of skin whitening, health, environment, sustainability
- iv. If mercury emissions were found outside the parlour, ask them if they know of any potential mercury emitting source in the area (waste incinerator, chloroalkali, coal fired power plant etc).
- c. **Sharing results:** AFTER the indoor measurement (see below) . Show the readings and explain that high levels are most likely linked to skin lightening products (assuming there is no other mercury source, e.g. dental cabinet using amalgam or other)
- d. Raising awareness:
 - i. Ask staff if they are aware that certain products may contain mercury and that it is hazardous.
 - ii. Explain the health risks of mercury inhalation and skin exposure.
- e. Product Inquiry:
 - a. Ask which skin-lightening products (SLPs) they use.
 - b. If appropriate ask where do they get them from (shops, online, which country etc,) and whether they ask for quality control from their providers.
 - c. Take pictures of the products if they allow you

4. Indoor Measurement Process

Enter the parlour and take a measurement with the door closed.

- a. Hold the Lumex device between hip and shoulder level
- b. Measure mercury levels in multiple areas (3-4 locations), depending on the setup:
 - i. Near the entrance or reception area
 - ii. In hallways or corridor
 - iii. Inside treatment rooms
 - iv. Near the shelf of beauty products
 - v. Just above the sink where they may be rinsing hands/recipients
- c. Take a picture of the reading on the spot in the different areas
- d. Record key factors that might affect mercury readings: Are windows open? Is ventilation or air conditioning on? Are beauty creams stored near customer areas?
- e. Ask if you can take a picture of the skin lightening products, if any
 - d. Find out how they obtain these products (e.g., bulk purchases, imported from suppliers outside Pakistan).

5. Keeping track of the results using the form

- a) Record all readings in a structured format, including location, time, and conditions.
- b) Keep notes of key exchanges with staff, including their responses and any concerns raised.
- c) Summarize findings from each parlour to ensure consistency in the final report.
- d) Organize collected data (measurements, pictures, and discussions) to facilitate report drafting.

Instructions for using the Lumex machine

For more details use the manual guide or the recording of the training session.

1. Initial setup

- Rear switch should be in position 3.

- Connect the tubes to the right-side hole.
- Keep the device in the dedicated bag. Tubing can be connected through the bag.
- The battery lasts 3–4 hours when fully charged.
 - Blinking light = charging. Steady light = fully charged.

2. Measurement Instructions

- **Warm-up time:** Turn the device on and wait 20–30 minutes before use to ensure there is no contamination from previous measurements.
- **Measure using the onstream mode:** Observe the Si value for 30 seconds (i.e., check it 3 times), note down all 3 values, and take the average.
- Restart **onstream mode every 10 minutes** to maintain accuracy. A 0-check is done automatically after launching the onstream mode to ensure the machine is working correctly.
- Do a **calibration test once a week** (with the testcell switch on the front panel). At any other moment, the testcell switch on the front panel must always be set to OFF.

3. Screen Readings:

- **S:** Instant concentration (updated every second).
- **Si:** 10-second averaged value (more reliable; record this).
- Standard: **< 10 ng/m³**
- Outdoor/street values can be **as low as 3–5 ng/m³**.

BEAUTY PARLOUR MERCURY ASSESSMENT FORM

1. General Information

- Date of Visit: _____
- Parlour Name: _____
- Parlour Location (Address & Area): _____
- Services offered addressed to (please select) : ☐ Men ☐ Women
- Services offered includes skin whitening: ☐ Yes ☐ No
- Environment/sustainability/other health policy: : ☐ Yes ☐ No
- How many staff were present: _____
- Role of the staff that were present:
☐ Receptionist, ☐ beautician/esthetician, ☐ manager ☐ Other (please specify): _____

2. Pictures taken (please check)

- ☐ Front of the Shop
- ☐ Beauty products
- ☐ Lumex Reading (outside and inside)
- ☐ Colleague using the Lumex (outside and inside)
- ☐ Other, please specify: _____

3. Mercury Level Measurements (Lumex readings in nanograms)

Measurement Location	Mercury Level (ng/m ³)	Notes (e.g., ventilation, proximity to products)
Outside area(baseline reading)		
Inside area		
Reception area		
Treatment room		
Treatment room 2 (if available)		
Treatment room 3 (if applicable)		
Near product shelves		
Other tested areas (please specify):		

4. Environmental Conditions

- Windows open? [] Yes [] No
- Ventilation / air conditioning system running? [] Yes [] No
- Creams stored near customer areas? [] Yes [] No

5. Staff Awareness & Product Inquiry

- Did staff know about mercury in products? [] Yes [] No
- Did staff acknowledge health risks? [] Yes [] No
- Which skin-lightening product brands do they use?

- Where do they buy the creams?

6. Additional Observations & Notes

Annexure B – Survey analytical readings

Set-up of the Lumex analyzer

To determine the mercury concentration in the ambient air through Lumex mercury analyzer, an On Stream mode was used.

The following were the steps followed for measurement.

1. Set the test handle to the OFF position.
2. On stream mode was selected from the main menu.
3. The optical bridge was set to position III.
4. Following readings/ measurements appeared.

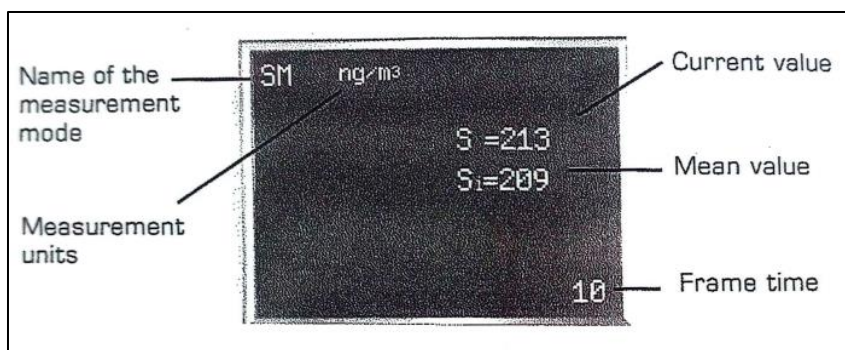


Figure 2: On Stream Mode Display on Lumex Mercury Analyzer

Current value (S): it is the mercury vapor concentration in the pumped air at the current moment. It is displayed at a repetition rate of 1 Hz and is measured in ng/m^3 .

Mean value (Si): it is the mean mercury concentration determined during the accumulation time. It is displayed once per accumulation time, and it is measured in ng/m^3 .

Frame time: it is the countdown of the accumulation time in seconds.

*Details of protocol and procedure are attached in annexure A.

Annexure B (ctd)

List of Beauty Parlor Surveyed along with the Readings

Sr. no.	Parlour Name		Outside Readings	Parlor	Inside Readings	Parlor
1	Parlor A	S ¹⁴	102		1203	
		Si ¹⁵	49		320	
		S	118		490	
		Si	94		942	
		Average	71.5		631	
2	Parlor B- Reception Area	S	7		127	
		Si	5		12	
		S	4		119	
		Si	9		3	

¹⁴ S= initial value

¹⁵ Si= average value

3	Parlor B - Treatment Room 1 (products are placed)	Average	7	13.5
		S	7	190
		Si	5	191
		S	4	195
		Si	9	191
		Average	7	191
	Parlor C- Reception Area	S	10	425
		Si	5	319
		S	11	402
		Si	4	418
		S		390
		Si		403
		Average	3.00	380.00
	Parlor C- Treatment Room	S		991
		Si		976
		S		974
		Si		950
		S		952
		Si		968
		Average		964.7
4	Parlor D- Reception Area	S	12	23
		Si	16	15
		S	25	11
		Si	16	1
		S	23	6
		Si	21	6

	Parlor D- Treatment Room	Average	17.67	7.3
		S		17
		Si		2
		S		18
		Si		32
		S		31
		Si		219
		Average		84.33
5	Parlor E	S	66	55
		Si	35	85
		S	94	114
		Si	78	112
		S	110	142
		Si	100	113
		Average	71.00	103.33
6	Parlor F	S	26	4
		Si	9	1
		S	52	4
		Si	47	10
		S	52	11
		Si	47	14
		Average	34.3	8.33
7	Parlor G	S	1	17
		Si	4	15
		S	8	15
		Si	11	11

		S	12	10
		Si	10	0
		Average	8.33	8.7
8	Parlor H	S	0	19
		Si	2	17
		S	1	18
		Si	1	17
		S	5	21
		Si	0	20
		Average	1.00	18.00
9.	Parlor I	S	10	402
		Si	5	298
		S	15	408
		Si	11	402
		S	14	402
		Si	10	402
		Average	8.67	367.33
10.	Parlor J- Reception Area	S	18	10
		Si	17	10
		S	21	13
		Si	20	15
		S	22	13
		Si	21	15
		Average	19.33	13.33
	Parlor J- Treatment Room 1	S		10
		Si		0

	S	49
	Si	36
	S	31
	Si	46
	Average	27.3

Association of beauty products and air quality and ventilatory conditions

Sr. #	Beauty Parlor	Product with expectedly high mercury concentration seen	Average Lumex Reading	Comments
1.	Parlor A	Jenson's, Dermacos, Thalgo	631	Poorly ventilated
2.	Parlor B	Jenson's/ Dermalogica/ Hydra/ Loreal		Moderately ventilated
3.	Parlor C	Jenson's	380	Poorly ventilated
4.	Parlor D	Jenson's, Thalgo		Ventilated
5.	Parlor E	Jenson's, Thalgo	103.3	Moderately ventilated
6.	Parlor F	Dermacos, Janssen's		Poorly ventilated
7.	Parlor G	Dermacos, Dr. Derma		Ventilated
8.	Parlor H	Dermacos, Dr. Derma		Ventilated
9.	Parlor I	Dermacos, Janssen's, Hilift	367.3	Poorly ventilated
10.	Parlor J	Janssen's, Thalgo		Ventilated

The data indicates that, along with the ventilation issue, mercury concentrations in the indoor environment tend to be higher in salons where Janssen and Dermacos cosmetic products are more frequently used, followed by those using Thalgo cosmetics

Annexure C

Brief overview of the Beauty Salon

1. Parlor A

This beauty parlor is in a commercial area of Ghorī Town, Islamabad. It operates out of a small shop situated in a basement, which lacks windows and relies on an exhaust fan for ventilation. To enhance airflow during operational hours, particularly during hair treatments, the main door is often kept open.

It was also observed that cosmetic products were stored near the customer seating area. The owner demonstrated awareness of the health risks associated with mercury-containing skin-whitening and lightening products. She stated that, prior to providing any services, clients are informed about the potential effects of the treatment. Additionally, clients are asked about any known allergies to specific products or chemicals prior to the provision of services, to ensure their safety and minimize potential health risks.

Regarding the procurement and usage of products, it was informed that the parlor typically procures its supplies from cosmetic wholesalers or traders in that area. The purchasing decisions are generally based on the frequency and extent of product utilization within the salon.

The following are the average Lumex reading inside and outside of the beauty parlor showing high as recommended by EPA¹⁶ mercury concentration inside the parlor

Parlor	Outdoor Mercury Level (ng/m ³)	Indoor Mercury Level (ng/m ³)	Comments
		TR 1	TR 2
Parlor A	71.5	631	> 300ng/m ³ (reference limit)

2. Parlor B

This parlor is situated in the commercial area of Ghorī town, Islamabad. The shop is located on the ground floor equipped with exhaust fan and windows. This shop is constituted of 2 rooms out of which 1 room is further divided into two sections. The parlor was open wide and broad. The products were placed little far from the main customer area while in treatment room two they were situated near the customer area.

Concerning the health hazards of skin whitening products, the owner was aware of those and quoted that they use the products which are recommended by their dermatologist. Moreover, clients are asked about any allergies due to any sort of chemicals prior to the treatment to ensure their safety and reduce health risks. Health and safety guidelines are provided to clients before and after treatment.

¹⁶www.efaidnbmnnnibpcajpcgglefindmkaj/https://archive.epa.gov/airquality/community/web/pdf/mercuryin-door.pdf

Regarding the procurement and usage of products, it was informed that the products are purchased from companies' websites or distributing agents. While the purchasing decision is based on the usage of the products.

The following are the average Lumex reading inside and outside of the beauty parlor.

Table 4: Mercury Level Measurements- Parlor B

Parlor	Outdoor Mercury Level (ng/m ³)	Indoor Mercury Level (ng/m ³)		Comments
		TR 1	TR 2	
Parlor B	7	13.5	191	< 300ng/m ³

It has been observed that the mercury level in treatment room 2 is high compared to other rooms. This might be due to low ventilation in the room. The overall mercury level is low according to the given limit by EPA.

3. Parlor C

This salon is located in a residential area of Rawalpindi, and a top tier beauty salon. For every type of services, the parlor has dedicated rooms, for example, the reception area, makeup lounge, Spa room, facial room etc. The mercury measurement was taken outside the parlor, inside the parlor at the reception area and near the facial services room (considered treatment room 2). Mercury reading outside the parlor is low whereas inside the parlor in treatment room 2 the mercury level was high as compared to treatment room 1, that is the reception area, but it is even less than permissible limit. The salon was well ventilated equipped with air conditioners, and windows.

The staff was aware of the dangerous effects of mercury and aware of potential health risks associated with them. It was informed that clients were given health and safety guidelines before giving any sort of service.

The purchasing of the products is based on the utilization and through companies and their distributors. The table given below shows the average mercury levels inside and outside the parlor.

Table 5: Mercury Level Measurements- Parlor C

Parlor	Outdoor Mercury Level (ng/m ³)	Indoor Mercury Level (ng/m ³)		Comments
		TR 1	TR 2	
Parlor C	3	380	964	Value is more than WHO reference limit > 300ng/m ³

It has been observed that the mercury level in treatment room 2 is high compared to other rooms. This might be due to inadequate ventilation in the room. The overall mercury level is low according to the given limit by EPA.

4. Parlor D

This is one of the top tier salons in the commercial area of Rawalpindi. It is located on the top floor of the building and fully equipped with air conditioners and windows. There were separate

rooms dedicated to different services. The mercury analysis was done in 2 different areas and outside the parlor.

Creams were not showcased openly and not near the customer area. While the staff and owners were aware of the dangerous effects of mercury, and other chemicals. Skincare and healthcare guidelines are being provided to the customer before the treatment and precautionary measures after the treatment. Both local and imported products are being used at this salon.

Procurement and purchasing of cosmetics are done through company's websites. And this is done based on utilization of the products.

The table given below shows the average mercury levels inside and outside the parlor. It has been observed that the mercury level in treatment room 2 is high compared to other rooms. This might be due to low ventilation in the room. The overall mercury level is low according to the given limit by EPA.

Table 6: Mercury Level Measurements- Parlor D

Parlor	Outdoor Mercury Level (ng/m ³)	Indoor Mercury Level (ng/m ³)	Comments
		TR 1	TR 2
Parlor D	17.67	7.3	84.3
			<300ng/m ³

5. Parlor E

It is a middle-tier beauty salon in the commercial area of Rawalpindi. The parlor is equipped with air conditioners and fans, and separate rooms are dedicated to different services. The cosmetics products are not fully showcased and not near the customer areas, but they guide the customer and take precautionary measures while giving any type of service.

The purchasing of the products is based upon usage and is done through company's website or through their distributing agents.

The table given below shows the average mercury levels inside and outside the parlor.

Table 7: Mercury Level Measurements- Parlor E

Parlor	Outdoor Mercury Level (ng/m ³)	Indoor Mercury Level (ng/m ³)	Comments
		TR 1	TR 2
Parlor E	71.3	103.3	
			< 300ng/m ³

6. Parlor F

The parlor is in the middle of the market area in a small shop with no window but has exhaust fan. Some times the door is kept little open for ventilation purpose. As it is a small setup the products were placed near the customer area. The staff have the knowledge of mercury and other chemical added products have hazardous effects on human skin. Therefore, they guide the customer and take precautionary measures prior to providing any services.

With regards to purchasing products, it is mostly done through company's website and based upon consumption and utilization.

The table given below shows the average mercury levels inside and outside the parlor.

Table 8: Mercury Level Measurements- Parlor F

Parlor	Outdoor Mercury Level (ng/m ³)	Indoor (ng/m ³)	Mercury Level	Comments
		TR 1	TR 2	
Parlor F	34.3	8.3		< 300ng/m ³

7. Parlor G

This parlor is situated in the commercial area of Rawalpindi. This is middle tier and provide grooming services to men including whitening facial and other skin treatment. The parlor does not have any window but has exhaust fan and the door is kept open at time of any service provision to client. Both imported and local products are used, and products are placed in the customer area. While the staff has knowledge of hazardous effects of chemicals added in the creams hence, they use them accordingly.

The products are purchased in bulk quantity from whole sellers or company's distributors.

The table given below shows the average mercury levels inside and outside the parlor.

Table 9: Mercury Level Measurements- Parlor G

Parlor	Outdoor Mercury Level (ng/m ³)	Indoor (ng/m ³)	Mercury Level	Comments
		TR 1	TR 2	
Parlor G	8.33	8.7		< 300ng/m ³

8. Parlor H

The salon is in the commercial area of Rawalpindi. There was no window but have exhaust fan for ventilation. The door has remained open for ventilation purposes. The creams and other products are placed near the customer area. Both local and imported products are used. These include brands like Soft touch, Dermacos, and others.

The purchase of products is usually done through pharmacies or directly through companies' websites. The purchasing decision depends on the usage and consumption of the products.

The table given below shows the average mercury levels inside and outside the parlor.

Table 10: Mercury Level Measurements- Parlor H

Parlor	Outdoor Mercury Level (ng/m ³)	Indoor (ng/m ³)	Mercury Level	Comments
		TR 1	TR 2	
Parlor H	1	18		< 300ng/m ³

9. Parlor I

This parlor is in the middle of the commercial area of twin city. For ventilation there is no window but only an exhaust fan. At the time of any treatment like hair treatment the products have a strong odor, the door of the parlor is kept open. The owner and the staff are aware of the dangers of the mercury and trained in taking precautionary measures during the service provision. The products are not placed near the customer area. Both local and imported products are being used in the parlor and their purchase depends on the utilization and consumption. Mostly the purchase is made through the company's website and pharmacies.

The table given below shows the average mercury levels inside and outside the parlor.

Table 11: Mercury Level Measurements- Parlor I

Parlor	Outdoor Level (ng/m ³)	Mercury Indoor (ng/m ³)	Mercury Level	Comments
		TR 1	TR 2	
Parlor I	8.67	367.3		> 300ng/m ³

10. Parlor J

It is one of the top tier salons in the commercial area of Rawalpindi. It has three floor parlors, and all floors are dedicated to different types of services. In basement no chemical related work eg, facial and hair treatment is done but on the top floor. The parlor is fully ventilated and well-ventilated ie, windows and exhaust fans. No products are placed near customer area. Mostly imported products are used.

The staff of the parlor is aware of mercury and associated risks to human health and skin. Health and safety guidelines are being provided to clients prior to the treatment. The staff take all the necessary precautionary measures while providing the treatment. The purchase of the products is based upon usage and is through company's websites.

The following are the average Lumex reading inside and outside of the beauty parlor.

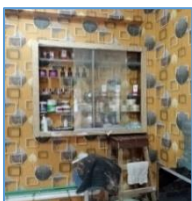
Table 12: Mercury Level Measurements- Parlor J

Parlor	Outdoor Level (ng/m ³)	Mercury Indoor (ng/m ³)	Mercury Level	Comments
		TR 1	TR 2	
Parlor J	8.67	13.3	27.3	< 300ng/m ³

It has been observed that the mercury level in treatment room 2 is high compared to other rooms. This might be due to low ventilation in the room. The overall mercury level is low according to the given limit by EPA.

Annexure D – Parlors which permitted to take pictures of products they are using for skin whitening

Sr. No.	Parlor Name	Products
---------	-------------	----------

1.	Salon A	
2.	Parlor B	  
3.	Parlor C	 
4.	Parlor F	

5.	Parlor G	
6.	Parlor H	
7.	Parlor I	

Note: The above-mentioned parlors only allowed the survey team to take pictures of the products they are using for skin whitening while each parlor visited mentioned the brands they are using upon query.

6. Annexure E - Lumax analyzer readings

