THAILAND

A. Regulation on sources

Source of lead	Relevant legislation/regulation	Government agencies	Data source
1. Lead in paint	1. Administrative Decree Requiring Alkyd Enamel Paints to Meet Industrial Product Standards, 2016/2017: no more than 0.01% lead, mercury and cadmium (dry weight) in all enamel paints.	a. Ministry of Natural Resources and Environment	1. Thailand Institutes Lead Paint Regulation
	No other standards found at this time for lead.		

B. International Agreements

Agreement	Year Ratified
1. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal	1997 (a)[1]
2. Rotterdam Convention on the Prior Informed Consent Procedure for certain hazardous Chemicals and Pesticides in international trade	2002 (a)
3. Minamata Convention on Mercury	2017
4. Stockholm Convention on Persistent Organic Pollutants	2005

[1] Accession (a)

C. Blood lead-level monitoring programs

Details	Data source
1. No details of a national or regional level structured program for blood lead level testing found. However, published studies point to some presence of testing programs at the local level.	1. Refer to section E on scientific papers that perform blood lead-level sampling

D. Inventory of toxic sites (Toxic Sites Identification Program (TSIP), Pure Earth)

Site	Province/Region	Details (all data comes from the TSIP website)
1. Lower Klity Community, Thongpapoom District, Kanchanaburi Province	Kanchanaburi	This lead mining site in the Thongpapoom Distric has contaminated local soil with very high levels of lead and is also contaminating waterways.
2. Laem Chabang, Chonburi Province	Chon Buri	Industrial contamination of waterways by shipping has caused elevated levels of cyanide and mercury in salt deposits.
3. Na Phra Lan Subdistrict, Chalermphrakiat District, Saburi Province	Saraburi	Na Pralan Sub-district is a rock-crushing and stone mining industrial area which ranked first in 2007 and 2008 for air pollution (PM10) by the Pollution Control Department. The air pollution is causing respiratory and lung problems in the community.
4. Akara Mining	Phichit	Gold mining site.
5. Pattani River Mouth, Pattani Bay	Pattani	Blood lead levels among school children living in the Pattani river basin.

E. Scientific papers on lead exposure (Please contact info@gahp.net for information on studies not in the public domain)

Topic	Authors	Year	Title	Abstract/ description
Blood lead levels	Kaewboonchoo, Orawan; Morioka, Ikuharu; Saleekul, Sumlee; Miyai, Nobuyuki; Chaikittiporn, Chalermchai; Kawai, Toshio	2010	Blood Lead Level and Cardiovascular Risk Factors among Bus Drivers in Bangkok, Thailand	**Abstract:** This study aimed to clarify the role of blood lead level (Pb-B) as one of the cardiovascular risk factors. To evaluate the cardiovascular risk the second derivative finger photoplethysmogram (SDPTG) was used. The subjects comprised of 420 male bus drivers in Thailand. The subjects' age ranged from 20 to 60 yr. Mean age (± standard deviation) were 41.6 (± 7.7) yr. Mean working years was 8.8 (± 6.8) yr. Pb-B ranged from 2.5 to 16.2 µg/dl with the mean Pb-B of 6.3 (± 2.2) µg/dl. The mean of aging index of SDPTG (SDPTG-AI) were -0.50 (± 0.30). The SDPTG-AI increases with age, Pb-B, smoking and alcohol consumption. There was significant correlation between Pb-B and SDPTG-AI after controlling for age, body mass index and lifestyle factors. These results suggest that Pb-B is possibly an independent cardiovascular risk factor for bus drivers exposed to lower level of lead.
	Lormphongs, Srirat; Miyashita, Kazuhisa; Morioka, Ikuharu; Chaikittiporn, Chalermchai; Miyai, Nobuyuki; Yamamoto, Hirochi	2003	Lead Exposure and Blood Lead Level of Workers in a Battery Manufacturing Plant in Thailand	Abstract: This study was conducted in a battery manufacturing plant where lead was used in the processes of production, to survey the working conditions and safety behaviors, and to measure the airborne lead level contaminated in the workplace and the blood lead level of workers. The survey of working conditions showed that the workers were directly exposed to lead in sections e.g. grid casting, spreading, forming and polishing, assembly and special battery production sections. Some workers in these sections used a cotton mask to protect dust exposure, but most workers did not use any masks. High airborne lead level more than 0.2 mg/m3 was frequently measured in these sections. Geometric average of blood lead level slightly increased from 17.9 µg/dl to 22.3 µg/dl during 1998 and 2001. However, the geometric average of blood lead level dropped to 17.4 µg/dl in 2002. No workers had blood lead level above 60 µg/dl. Workers with different age groups had no significantly different average blood lead level. Workers whose duration of work was between 20-29 years had average blood lead level of 21.5 µg/dl. This group of workers had slightly higher blood lead level than those whose

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				duration of work was 19 years or less, but with no significant difference. 21 subjects underwent annual health examination and exposure monitoring in 2002. There was no significant relation between airborne lead level and blood lead level.
	Sirivarasai, Jintana; Kaojaren, Sming; Wananukul, Winai; Srisomerang, Preera	2002	Non-Occupational Determinants of Cadmium and Lead in Blood and Urine Among a General Population in Thailand	In this study the levels of cadmium and lead in blood and urine were measured by the method of graphite furnace atomic absorption spectrometry in 356 healthy, non-occupationally exposed individuals and the factors affecting the metal concentrations were investigated. The geometric means for cadmium in blood and urine were 0.98 µg/l (Cd-B) and 0.87 µg/gCr (Cd-U). The lead levels were 32.5 µg/l for blood (Pb-B) and 2.54 µg/gCr for urine (Pb-U). Men had significantly higher blood cadmium and lead levels than women whereas the urinary excretion rates of both metals were higher in women than men. Cigarette smoking was found to affect the levels of Cd-B, Cd-U, and Pb-B. Other factors like alcohol intake and place of residence also related to blood lead levels. Both blood and urine levels of cadmium and lead in this study group were within acceptable ranges for non-occupationally exposed populations and were decreased compared with the past. It is important to continue monitoring levels of these metals in order to prevent adverse health effects in the Thai population.
Health assessment lead	Pusapukdepob, Kitrapun; Sawangwong, Pichan; Pulket, Chompusakdi; Satraphat, Duangduen; Saowakontha, Sastri; Panutrakul, Suwanna	2007	Health Risk Assessment of Villagers Who Live Near a Lead Mining Area: A Case Study of Klity Village, Kanchanaburi Province, Thailand	Abstract: This was a cross-sectional study aimed at assessing environmental lead exposure and its association with blood lead levels, teeth lead levels and IQ of the inhabitants who live near lead mining in Kanchanaburi Province, Thailand. Two hundred fifteen villagers from 6villages participated in this study. Exposed and non-exposed villagers were asked to perform IQ tests based on Raven's Standard Progressive Matrices. Environmental, blood and tooth samples were collected and analyzed to determine an association with the IQ level. The results showed that soil, vegetables (mint, bitter gourd, Chinese watercress, basil and turmeric) and meat (fish and shellfish) had lead concentrations above the recommended standard. Each person in the exposed group had blood and tooth lead levels higher than 10 µg/dl and 10 µg/g, respectively. The mean IQ of

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				the exposed group was 82.70 ($p<0.05$). The blood and tooth levels in the non-exposed group were lower than 10 µg/dl and 10 µg/g, respectively. The mean IQ scores in the non-exposed group was 96.14 ($p<0.05$). The health risk in the low IQ score exposed group was 5.6 times more than the non-exposed group ($p<0.05$). The IQ scores of the exposed group were significantly inversely associated with the blood lead and tooth lead levels ($r = 0.397$ and 0.129, respectively, $p<0.05$). The children in this study who were exposed to environmental lead had an accumulation of lead in their bodies. This resulted in a great impact on intellectual development. The results reveal that blood lead levels are the best predictor of lead exposure, and the tooth lead levels may provide epidemiological evidence for chronic toxicity. Populations with blood lead or tooth lead levels higher than normal limit should be treated with chelation therapy and health education.
Lead and children	Youravong, Nattaporn; Chongsuvivatwong, Virasakdi; Geater, Alan; Dahlén, Gunnar; Teanpaisan, Rawee	2006	Lead associated caries development in children living in a lead contaminated area, Thailand	**Abstract:** In an observational cross-sectional design, a sample of 292 children aged 6–11 years from two primary schools around a shipyard area, known to be an area contaminated with lead (from the industry), were examined to verify the cariogenicity of lead. The number of decayed and filled surfaces on deciduous teeth (dfs), and the number of decayed, missing, and filled surfaces on permanent teeth (DMFS), the salivary flow rate, pH, buffer capacity, oral hygiene, Lactobacillus spp. and mutans streptococci counts were recorded. The mean (range) of DMFS and dfs were respectively 1.3 (range 0–17) and 13.2 (range 0–45); and the geometric mean blood lead level (PbB) and SD were 7.2 and 1.5 µg/dl. The level of dfs, but not DMFS correlated with the blood lead level ($Rs = 0.25$, $p = 0.00$ / $Rs = 0.09$, $p = 0.14$). The odds ratio for DMFS ≥ 1 and dfs > 5 for a doubling of PbB after adjusting for other factors were 1.28 (95%CI, 0.81–2.04; p value = 0.35) and 2.39 (95%CI, 1.36–4.20; p value = 0.004), respectively. The cariogenicity of lead is evident in deciduous teeth but not in permanent teeth for this age group.
Lead exposure	Kiddee, Peeranart; Decharat, Somsiri	2018	Risk assessment of lead and cadmium	**Abstract:** Electronic waste (e-waste) contains a variety of toxic substances that can be released into the surrounding environment

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			exposure from electronic waste recycling facilities in Southern Thailand	and adversely affects human health when a primitive recycling process is used. This research aims to investigate the concentrations of lead and cadmium in soil and in the blood of workers at e-waste recycling facilities, to examine the correlation between the concentrations of lead and cadmium in soil and in the blood of the workers and to assess the health risks from the exposure of lead and cadmium in the soil at the e-waste recycling facilities. The results of this study showed that the concentrations of lead and cadmium found in the soil were 1.150 ± 0.00–2866.97 ± 31.54 and 0.181 ± 0.00–0.200 ± 0.00 mg/kg, respectively. The concentrations of lead were over the standard limit in Thailand. Moreover, the concentration of lead in the soil correlated to that in the blood of the workers. The concentration of lead in the men's blood was two times higher than in the women's blood. Lead and cadmium concentrations in smokers' blood were higher than that in the non-smokers. The determinations of lead and cadmium exposure among workers at e-waste recycling facilities were 1.54 × 10−6–6.28 × 10−3 and 9.05 × 10−8–2.27 × 10−7 mg/kg, respectively. The greatest Hazard Quotient (HQ) of lead exceeded 1.74, signifying that high exposure of lead might pose a potential health risk to workers in e-waste recycling facilities.
	Thanapop, Chamnog; Geater, Alan; Robson, Mark; Phakthongsuk, Pitchaya; Viroonudomphol, Duankgamol	2007	Exposure to Lead of Boatyard Workers in Southern Thailand	**Abstract:** Lead oxide is used extensively in the construction and repair of wooden boats in Thailand, but the behaviors of boatyard workers that could place them at risk of contamination have not previously been documented. Baseline data on practices and behaviors of boatyard workers and on the level of worker and workplace contamination with lead were therefore collected. Fifty workers in two boatyards participated in this study. Lead exposure of workers was assessed by determining airborne and blood lead levels. A questionnaire was administered to collect information on work history, suspected exogenous lead sources, personal behavior and knowledge about lead. Evidence obtained by the study indicated that safety behavior and personal hygiene were poor—workers used no mask, gloves or hood, wore open sandals, smoked, drank, chewed and ate during work and did not wash their hands before drinking or eating. Some workers had lunch in the working area. The mean

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				personal airborne lead of caulkers (36.4 µg/m3) was higher than that of carpenters (8.3 µg/m3). Forty-eight percent of all workers and 67% of caulkers had a blood lead level (BLL) exceeding 40 µg/dl. Multiple linear regression indicated that blood lead levels of workers were significantly related to job and education level, with significant differences between boatyards. In addition, the potential for “takehome” contamination was high; none of the workers took a shower or changed their clothes prior to going home. These results indicate a problem of lead exposure of sufficient magnitude to be a public health concern.
	Yuravong, Nattaporn; Chongsuvivatwong, Virasakdi; Teanpaisan, Rawee; Geater, Alan; Dietz, Wolfram; Dahlen, Gunnar; Noren, Jorgen	2005	Morphology of enamel in primary teeth from children in Thailand exposed to environmental lead	**Abstract:** Lead is one of the major environmental pollutants and a health risk. Dental hard tissues have a capacity to accumulate lead from the environment. Eighty exfoliated primary teeth were collected from children residing around a shipyard area in southern Thailand, known for its lead contamination. The morphology of the enamel was examined by polarized light microscopy (PLM), microradiography (MRG), and scanning electron microscopy (SEM). The specimens derived from two groups of children, one group with high blood levels of lead (57 teeth) and one group having low blood levels of lead (23 teeth). The enamel irrespective of group appeared normal. However, in a majority of the specimens the enamel surface appeared hypomineralized, which was confirmed in SEM. No morphological changes connected to lead in blood could be found. The hypomineralized surface zone could possibly be attributed to an acid oral environment.
	Tantanasrikul, S; Chaivisuth, B; Siriratanapreuk, S; Padungtod, C; Pleubreukan, R; Boonnark, T; Worahan, S; Bhumiratanarak, P; Chomchai, C	2002	The management of environmental lead exposure in the pediatric population: lessons from Clitty Creek, Thailand.	**Background:** During the month of September-October 1997, a depression storm caused massive flooding in the area of western Kanchanaburi province, Thailand, causing lead-contaminated water from a nearby lead refinery plant to spill into the surrounding areas of Clitty Creek; exposing the village downstream to large amounts of lead. The Ministry of Public Health, together with the Ministry of Science, the Ministry of Industry, and officials from the Kanchanaburi Office of Public Health, began measures for environmental deleading and assessment of exposure and health risks of the population.

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				Method: This was a retrospective cohort study of the effects that environmental remediation and chelation therapy had on the blood lead levels of children residing in Lower Clitty Creek Village during the period between 1997-2001. Sixty-eight children were followed yearly for their blood lead levels and hematocrit, beginning in early 1998. Simultaneously, programs for environmental remediation had begun. The blood lead levels (BLLs) of children were followed over a 3-year period. The BLLs during the 2 year period of environmental remediation alone were compared. Subsequently, when chelation therapy was instituted, levels pre and post chelation therapy, as well as the efficacy of the two different chelation methods were compared using standard 2-tailed t-test. **Results:** The initial average BLL was 27.75 +/- 5.4 mg/dl (1998). After environmental remediation began, BLL at one year (1999) was 30.64 +/- 4.49 mg/dl ($p = 0.072$), and at two years (2000) was 30.30 +/- 5.1 mg/dl ($p = 0.537$). There were 18 children with BLLs > 25 who were elected to receive chelation therapy with CaNa2EDTA (11) and DMSA (7). Post chelation average BLL was 18.73 +/- 7.50 mg/dl. The difference between pre and post chelation BLL was statistically significant ($p < 0.001$: paired t-test). The differences in average BLLs between pre and post chelation for the EDTA group was 15.37 mg/dl and for the DMSA group it was 8.91 mg/dl. Children treated with EDTA appeared, on average, to have 6.47 mg/dl ($p < 0.05$: 95% CI (0.821-12.12)) lower BLL than those treated with DMSA. **Conclusion:** The incident at Clitty Creek serves to illustrate the importance of environmental remediation as a priority to treating lead poisoning in children. Only when effective environmental deleading has taken place can medical intervention in the form of chelation therapy begin.
	Zhanf, Zuo-Wen; Shimbo, Shinichiro; Watanabe, Takao;	1999	Non-occupational lead and cadmium exposure of adult	**Abstract:** This survey was conducted to examine the extent of the exposure of Bangkok citizens to lead (Pb) and cadmium (Cd), and to evaluate the role of rice as the source of these heavy metals. In

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	Srianujata, Songsak; Banjong, Orapin; Nakatsuka, Haruo; Matsuda-Inoguchi, Naoko; Chitchumroonchokchai, Chureeporn; Higashikawa, Kae; Ikeda, Masayuki		women in Bangkok, Thailand	practice, 52 non-smoking adult women in an institution in the vicinity of Bangkok, volunteered to offer blood, spot urine, boiled rice and 24-h total food duplicate samples. Samples were wet-ashed, and then analyzed for Pb and Cd by ICP-MS. Geometric means for the levels in blood (Pb-B and Cd-B) and urine (Pb-U and Cd-U as corrected for creatinine concentration), and also for dietary intake (Pb-F and Cd-F) were 32.3 µg/l for Pb-B, 0.41 µg/l for Cd-B, 2.06 µg/g creatinine for Pb-U, 1.40 µg/g creatinine for Cd-U, 15.1 µg/day for Pb-F and 7.1 µg/day for Cd-F. Rice contributed 30% and 4% of dietary Cd and Pb burden, respectively. When compared with the counterpart values obtained in four neighboring cities in southeast Asia (i.e. Nanning, Tainan, Manila, and Kuala Lumpur), dietary Pb burden of the women in Bangkok was middle in the order among the values for the five cities. Pb level in the blood was the lowest of the levels among the five cities and Pb in urine was also among the low group. This apparent discrepancy in the order between Pb-B (i.e. the fifth) and Pb-F (the third) might be attributable to recent reduction of Pb levels in the atmosphere in Bangkok. Regarding Cd exposure, Cd levels in blood and urine as well as dietary Cd burden of Bangkok women were either the lowest or the next lowest among those in the five cities.
Lead in plants	Rotkittikhun, P.; Kruatrachue, M.; Chaiyarat, R.; Ngernsansaruay, C.; Pokethitiyook, P.; Paijitprapaporn, A.; Baker, A.J.M.	2006	Uptake and accumulation of lead by plants from the Bo Ngam lead mine area in Thailand	**Abstract:** A field survey of terrestrial plants growing on Bo Ngam lead mine area, Thailand, was conducted to identify species accumulating exceptionally high concentrations of lead. Plant and soil samples were collected from five areas. Lead concentrations in surface soil ranged from 325 to 142 400 mg/kg. The highest lead concentration in soil was found at the ore dressing plant area and lowest at a natural pond area. In different areas, the concentrations of lead in plants were different when comparing various study sites. A total of 48 plant species belonging to 14 families were collected from five sampling sites. Twenty-six plant species had lead concentrations more than 1000 mg/kg in their shoots. Three species (Microstegium ciliatum, Polygala umbonata, Spermacoce mauritiana) showed extremely high lead concentrations in their shoots (12 200–28 370 mg/kg) and roots (14 580–128 830 mg/kg).

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Lead monitoring	Phenrat, Tanapon; Otwong, Ashijya; Chantharit, Apichart; Lwory, Gregory	2016	Ten-Year Monitored Natural Recovery of Lead-Contaminated Mine Tailing in Klity Creek, Kanchanaburi Province, Thailand	**Background:** Klity Creek has become Thailand's first official remediation ordered by the court in 2013, 15 years after the spill of lead (Pb)-contaminated mine tailing into the creek. The Pollution Control Department (PCD) decided to restore the creek through monitored natural recovery (MNR) since 2006 but has not been successful. Interestingly, the most recent remediation plan in 2015 will still apply MNR to five out of the seven portions of the creek, despite no scientific feasibility evaluation of using MNR to restore the creek. **Objective:** This study qualitatively and quantitatively evaluated the feasibility of using MNR to clean up the creek in order to protect the Klity children from excess Pb exposure. **Methods:** We analyzed the physical and chemical transformation of Pb contaminated sediment in the creek and developed a remedial action goal and cleanup level using the Integrated Exposure Uptake Biokinetic model (IEUBK). We empirically determined the natural recovery (NR) potentials and rates using 10 years of data monitoring the water and sediment samples from eight monitoring stations (KC1 to KC8). **Results:** Klity Creek has NR potential for water except at KC2, which is closest to the spill and the other improperly managed Pb sources. However, the creek has no NR potential for sediment except at the KC8 location (NR rate = 11.1 ± 3.0 × 10–3 month–1) farthest from the spill. **Conclusion:** The MNR method is not suitable to use as the sole remedial approach for Klity Creek (KC2 to KC7). Although MNR is applicable at KC8, it may require up to 377 ± 76 years to restore the sediment to the background Pb concentration.
Lead pollution	Thanapop, Chamnog; Geater, Alan; Robson, Mark; Phakthongsuk	2013	Elevated Lead Contamination in Boat-caulkers'	**Abstract:** Surface-wipe lead loading was measured at various locations in the homes of 31 boat-caulkers and 31 location-matched controls to identify factors associated with household lead contamination. Data were obtained by observation checklist and

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			Homes in Southern Thailand	questionnaire. Lead loading was significantly higher in caulkers' than in control households. Median lead loadings (in µg/ft2) of various locations in caulkers' homes were windowsill, 43.9; exterior entrance, 9.5; interior entrance, 21.1; living room floor, 9.8; and bedroom floors 15.6. Corresponding levels in control homes were all less than 0.2 µg/ft2. Regression modeling indicated that lead loading was higher in caulkers' homes that were closer to a boatyard, in which the caulker had a longer duration of boatyard work, and in which there were no children aged under 6 years resident. Exterior and interior entrance and living room floors had lower lead loading than windowsills. However, bedroom floors had significantly higher lead loading, similar to windowsills.
	Parkpian, Preeda; Leong, Shing; Laortanakul, Preecha; Thunthaisong, Nasavan	2003	Regional Monitoring of Lead and Cadmium Contamination in a Tropical Grazing Land Site, Thailand	**Absract:** An investigation was carried out to monitor Pb and Cd contamination in grazing land located near a highway. Environmental media at different distances from highway (soil, grass, water, cow's forage, fertilizer, manure and milk samples) were collected from three sampling locations. Soil and grass were characterized by high metal mobility (soil with Pb: 5.25±0.71–14.59±1.17 mgkg-1, dry mass and Cd: 0.038–0.33±0.04 mg kg-1, dry mass and grass with Pb: 0.76±0.05–6.62±0.18 mg kg-1, dry mass and Cd: 0.17±0.01–0.73±0.09 mg kg-1, dry mass). One-way analysis of variane (ANOVA) was applied to find out the correlation between metal (total and bioavailable) concentrations in the soil and the distance from roadside. In most cases, the finding showed that plants growing nearer to the highway are usually exposed to more heavy metal accumulations than those away from the highway. In addition, a correlation was established between plant available metal concentrations and plant metal uptake concentrations. Analysis of fertilizer and manure showed considerable amount of metals (fertilizer with Pb: 1.53±0.06 mg kg-1 and Cd: 0.038 mg kg-1 and manure with Pb: 2.55–3.34 mgkg-1 and Cd: 0.14–0.31 mg kg-1). Long term simultaneous application of fertilizer and manure on the commercial farm showed higher metal accumulation in the soil and plants than those of co-operative farm Considerable concentrations of metals (Pb: 1.60–2.94 mg kg-1 and Cd: 0.025–0.19 mg kg-1) were observed in fodder. The finding clearly demonstrated

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				that there are seasonal variation in total daily metal intake by individual cow (Pb:109.37 mg day-1 (dry), 273.47 mg day-1 (rainy) and Cd: 2.02 mg day-1 (dry), 19.62 mg day-1 (rainy)). The provisional tolerable weekly intake of heavy metals in cows is 390 µg Pb and 28 µg Cd per kg bodyweight in the rainy season and 156 µg Pb and 2 µg Cd per kg body weight in the dry season. The levels of metals (Pb: 0.014 mg L-1 and Cd: not detectable) and bio-transfer factor (10-5–10-4) in raw milk were found to be well below the Codex Alimentarius Commissions Draft (1997). Our analysis revealed that improvements on farm management give significant reduction in elevated levels of Pb and Cd in soil and plants, and however leads to minimize the amount of Pb and Cd in consumed milk.
Lead in saliva	Thaweboon, Sroisiri; Thaweboon, Boonyanit; Veerapradist, Woranut	2005	Lead in Saliva and its Relationship to Blood in the Residents of Klity Village in Thailand	**Abstract:** Lead concentrations in whole blood and saliva were examined in 16 females and 13 male sliving in Klity village, a highly contaminated area from lead mining, Thailand. The geometric mean for the lead content in the blood was 24.03 µg/dl (range 11.80-46.60 µg/dl) while the lead content in the saliva was 5.69 µg/dl (range 1.82-25.28 µg/dl). No significant differences were found between the concentrations of lead in blood and saliva in relation to the age of the subject. Males were found to have higher blood lead levels than females. The coefficient of correlation γ between salivary and blood lead levels was -0.025. Our data suggests that saliva is not suitable material for biological monitoring with respect to lead exposure.

F. Blood testing in National Health Surveys

National Health Survey	Non-Communicable Diseases Risk-Factors Surveillance	Source
Purpose	To determine the prevalence of certain health condition and risk factors at the country level, urban/rural areas and geographical region.	National Health Examination Survey, Thailand, Faculty of Medicine, Health System Research Institute.

Sample size	Multi-stage random sampling of 30,000 individuals age 1+ years; 5 provinces/regions + Bangkok = 21 provinces	National Health Examination Survey, Thailand, National Health Examination Survey Office, Health System Research Institute
Blood sample testing	Blood samples for obesity, diabetes, nutrition, risk behavior, reproductive health, etc	
Latest round	2016	
Next round	2021	