

## HAITI

A.	<a href="#">Regulation on sources</a> .....	2
B.	<a href="#">International Agreements</a> .....	3
C.	<a href="#">Blood lead-level monitoring programs</a> .....	3
D.	<a href="#">Inventory of toxic sites (Toxic Sites Identification Program (TSIP), Pure Earth)</a> .....	3
E.	<a href="#">Scientific papers on lead exposure</a> .....	3
F.	<a href="#">Blood testing in National Health Surveys</a> .....	6

### A. Regulation on sources

Source of lead	Relevant legislation/regulation	Government agencies	Data source
1. Used lead-acid battery recycling	No specific regulations for ULAB recycling found		
2. Standards for lead in food	No specific regulations for lead in food found		
3. Standard for lead in cookware	No specific regulations for lead in cookware found		
4. Standards for occupational exposure	No specific regulations found		<a href="#">ILO</a> . 2015. National OSH Regulatory Framework.
5. Lead in paint	No current lead paint regulations		<a href="#">UNEP</a> . 2019. Update on the Global Status of Legal Limits on Lead in Paint September 2019.
6. Waste generated from smelting or mining	No specific regulations found		

### B. International Agreements

No relevant international agreements

### C. Blood lead-level monitoring programs

No details of a national or regional level structured program for blood lead level testing found

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

No sites yet identified

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

Topic	Authors	Year	Title	Abstract/ description
Childhood exposure	Carpenter, Chris, Brittany Potts, Julia von Oettingen, Ric Bonnell, Michele Sainvil, Viviane Lorgeat, Mie Christine Mascary, Xinshu She, Eddy Jean-Baptiste, Sean Palfrey, Alan D. Woolf, and Judith Palfrey	2018	<a href="#">Elevated Blood Lead Levels in Infants and Children in Haiti, 2015</a>	<p><b>Objective:</b> Few studies have reported blood lead levels (BLLs) in Haitian children, despite the known presence of lead from environmental factors such as soil, water, leaded paint and gasoline, improperly discarded batteries, and earthquakes. We sought to determine the prevalence of elevated blood lead levels (EBLLs) among healthy Haitian children.</p> <p><b>Methods:</b> We enrolled children aged 9 months to 6 years from 3 geographic areas in Haiti (coastal, urban, and mountain) from March 1 through June 30, 2015. We obtained anthropometric measurements, household income, potential sources of lead exposure, and fingerstick BLLs from 273 children at 6 churches in Haiti. We considered a BLL <math>\geq 5 \mu\text{g/dL}</math> to be elevated.</p> <p><b>Results:</b> Of 273 children enrolled in the study, 95 were from the coastal area, 78 from the urban area, and 100 from the mountain area. The median BLL was <math>5.8 \mu\text{g/dL}</math>, with higher levels in the mountain area than in the other</p>

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				<p>areas (<math>P &lt; .001</math>). BLLs were elevated in 180 (65.9%) children. The prevalence of EBLL was significantly higher in the mountain area (82 of 100, 82.0%; <math>P &lt; .001</math>) than in the urban area (42 of 78, 53.8%) and the coastal area (56 of 95, 58.9%; <math>P &lt; .001</math>). Twenty-eight (10.3%) children had EBLs <math>\geq 10 \mu\text{g/dL}</math> and 3 (1.1%) children had EBLs <math>\geq 20 \mu\text{g/dL}</math>. Exposure to improperly discarded batteries (<math>P = .006</math>) and living in the mountain area (<math>P &lt; .001</math>) were significant risk factors for EBLs.</p> <p><b>Conclusions:</b> More than half of Haitian children in our study had EBLs. Public health interventions are warranted to protect children in Haiti against lead poisoning.</p>
Child lead exposure	Keith, Bahareh, Cert One Health Environmental and Global Health, Taina Telisma, Madesen Beau De Rochars, Judy Lew, Yong Kim, and Mike Edzards	2018	Lead Toxicity Risk in Children in Three Rural Village Schools in Haiti- a One Health Study	<p><b>Background:</b> Lead toxicity can lead to anemia, encephalopathy, decreased neuropsychological test scores, increased delinquent behavior, and decreased IQ. The CDC, the American Academy of Pediatrics, and the Environmental Protection Agency (EPA) agree that prevention is the best approach to improve morbidity from lead exposure. Studies on immigrant children show that Haitian children are among the highest for the rate of lead toxicity. The source of most lead poisoning in US children is dust and chips from deteriorating lead paint on interior surfaces. Dust from mining or lead smelting, battery recycling, and discarded electronics are additional sources of lead in developing countries.</p> <p><b>Methods:</b> We evaluated the environment and risk for exposure 5 years after the 2010 earthquake that destroyed 70% of the buildings in the districts of Haiti's capital city Port-au-Prince. During routine pediatric physical exams in the village schools at of Jean Jean, Ti Boukan, and Tikouzen (where a recent survey suggested a high prevalence of anemia in the children,) we conducted an exposure assessment through questioning of parents and children. We asked if they played in areas of construction or broken down buildings/ rubble. We sought out testing sights for patient blood lead level testing and were unsuccessful. We obtained environmental dirt and paint samples from schools to assess their exposure from these sources. Sample analysis was performed by Florida Spectrum Environmental Services by ICP-MS, using a modification of EPA SW-846 Method 6010B.</p> <p><b>Outcome/ Interpretation:</b> Our environmental survey demonstrated a high rate of construction and old buildings. We found that lead screening is</p>

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				<p>rarely done and testing is often unavailable in Haiti. Of the 359 children questioned 263 were able to answer and 72 percent of these children responders had played in construction areas or in rubble. Given this high level of exposure in Haitian children it is likely that there is significantly elevated serum lead levels in these children. However, testing of schoolyard dirt and paint chips showed non-concerning levels (table 1). Given this finding we should complete environmental assessment in the home local. Additionally, the low level of awareness and testing in Haiti demonstrates the need for increased medical education on the subject. Going Forward: We hope to use these findings as grounds for a pilot study of blood level screening of Haitian children including home environmental assessment. Through documentation of high exposure we hope to improve clinician education and affect policy change in order to protect children in Haiti from lead toxicity, a disease that WHO has identified as problematic in developing countries. Previous studies showing elevated lead levels in Port au Prince water sources, testing the water in addition to paint and dirt in the rural villages may be also more fruitful.</p>
Environmental exposure	Emmanuel, Alexandra and Simon, Yanick	2018	<a href="#">Environmental lead exposure and its impact on the health of children, pregnant women and the general population in Haiti</a>	<p><b>Background:</b> Exposure to lead is well known to have detrimental effects on the environment and human health, including almost every organ and system in the body. In Haiti, although leaded gasoline has been banned since 1998, lead is still present in the environment due to its persistence and bioaccumulative capacities. In addition to lead air emissions, urban groundwater resources are exposed to lead. The Haitian population is exposed to a widespread urban health problem that especially affects children and pregnant women who are more vulnerable.</p> <p><b>Methods:</b> In order to understand environmental lead pollution in Haiti, a literature review in the MEDLINE/PUBMED database was conducted on lead in drinking water from 1997 to 2016. The inclusion criteria included all studies that reported the prevalence of blood lead levels in the general population and studies assessing the risk of exposure to lead in drinking water in different regions of the country.</p> <p><b>Results:</b> This work gives an overview of exposure to lead in the environment, its impact on the health of the Haitian population and indicates requirements for future policy responses and interventions.</p>

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Environmental exposure	Evens Emmanuel, Ruth Angerville, Osnick Joseph, Yves Perrodin	2008	Human health risk assessment of lead in drinking water: a case study from Port-au-Prince, Haiti	<p><b>Background:</b> In Latin America and the Caribbean (LAC), human intoxication to lead is considered as an important public health issue. In Port-au-Prince, concentrations of lead ranging from 40 ug/L to 90 ug/L, greater than the threshold value (10 ug/L) for drinking water, were measured in groundwater and drinking water. This study aims to assess human health risks generated by exposure to lead in the Port-au-Prince water supply.</p> <p><b>Methods:</b> Two sampling campaigns were performed between April 2004 and December 2004 on different structures of the public water supply.</p> <p><b>Results:</b> A significant lead concentration of 250 ug/L, greater than the threshold value, had been detected in a water tank. Risk of deterioration of the psychological development of children exposed to these waters was calculated. These results require monitoring in order to control the human health risk by lead in Port-au-Prince's drinking water.</p>

## F. Blood testing in National Health Surveys

National Health Survey	Haiti Demographic and Health Survey	Source
Purpose	The purpose of this survey is to track outcomes associated with child and maternal health, family planning, nutrition, health behavior and knowledge, health care access and use, and immunization.	<a href="#">Haitian Institute of Childhood (IHE), Haitian Institute of Statistics and Informatics, ICF International, Ministry of Public Health and Population (Haiti)</a> . Haiti Demographic and Health Survey 2016-2017. Fairfax, United States of America: ICF International.
Sample size	The sample consists of 13,405 households, 14,371 women (age 15 to 49) and 9,795 men (age 15 to 64).	
Blood sample testing	Blood samples were taken to check for anemia in women, men, and children.	
Latest round	2016-17	
Next round	Unknown	