LEAD-FREE KEIKI!

KEEPING OUR KEIKI LEAD-FREE:

A Training for Families of Young Children & People Who Support Them

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Course Overview

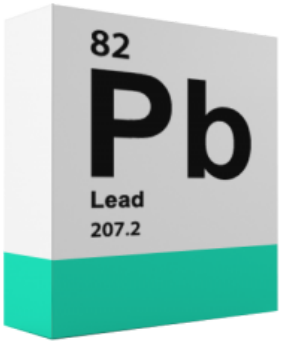
Lead poisoning is the most preventable environmental health threat to children in the United States. In Hawai'i, only 1 out of every 4 children are tested for lead exposure, and families often do not get the information they need to protect their children from the many lead sources all around them. This course will provide detailed information on how to prevent lead exposure, how to catch exposure early if it has already occurred, and how to help lead-exposed children overcome the harmful effects of lead. This course will also provide tools for families of young children and those who support them. These tools include (1) Education topics for families, (2) Information on how to test for lead and get rid of it, (3) An implementation protocol for providers working with young children, and (4) A list of compiled resources and handouts for families.

Course Lessons:

1. Lead in Our Environment
2. Sources of Lead in Hawai'i
3. Blood Lead Testing
4. Symptoms of Lead Poisoning
5. Education & Tools for Prevention
6. Protocol & How To Implement (For Providers)
7. Summary & Resources

Lesson 1: Lead in Our Environment

Lesson 1 Overview



Lead is a naturally-occurring toxic metal that is dangerous to a child's health. Children can be exposed to sources of lead in their everyday environment, including lead-based paint, contaminated soil and dust, and consumer products used on a daily basis. Behaviors such as playing on the ground and putting their hands or other objects in their mouth further increase the risk of a child ingesting or inhaling lead that is around them.

Objectives

At the end of this lesson, you will be able to:

- Explain what lead is and its properties.
- Describe the difference between the two types of lead.
- Describe the historical use of lead in the United States.

Topic 1: Properties of Lead

Lead is a soft, blue-gray metal found naturally in the earth's soil. Lead can combine with other metals to form alloys used for products like ammunition, pipes, and building materials. Lead can also combine with other elements to create chemical compounds which are very stable and easily accumulate in the environment.

> Although naturally occurring, **lead is one of many heavy metals that can cause serious harm to the body.**

Lead compounds are used in a variety of consumer products as stabilizing agents to produce certain qualities like flexibility, increased weight, and resistance to corrosion. For example, a variety of lead compounds were used in lead-based paint to manipulate qualities like paint pigmentation, drying time, durability and moisture resistance. This made lead-based paint ideal for use in homes, on metal exposed to the elements, and even children's toys.

Lead-based paint is a primary source of childhood lead poisoning. One compound found in lead-based paint is lead acetate. Lead acetate has a sweet taste which puts young children at-risk for eating paint chips and chewing on surfaces such as window sills and furniture painted with lead-based paint.

Topic 2: Organic Versus Inorganic Lead Compounds

There are two different types of lead compounds: **inorganic** and **organic**.

The main focus of this course will be on inorganic lead toxicity.

> **Inorganic lead compounds** comprise the majority of lead in our environment today, and include lead-based paint, dust, soil, and various consumer products.

Although less common, **organic forms of lead** are extremely dangerous because they can be absorbed through intact skin and are more toxic to the brain and central nervous system than inorganic lead. Lead poisoning due to organic compounds is usually a consequence of industrial and occupational exposure.

Two examples of organic lead compounds are tetraethyl lead (TEL) and tetramethyl lead (TML). Both of these compounds were commonly used as gasoline additives in the past, but were gradually phased out in the 1980's due to environmental concerns. Today, tetraethyl lead may still be used in gasoline for off-road vehicles and airplanes.

Topic 3: Historical & Present Use of Lead

The use of lead in everyday objects dates back to the ancient Romans, but in the United States, the elevated presence of lead in the environment generally stems from its historic use in paint and gasoline.

The following are examples of some of the main historical and present uses of lead in our everyday environment:

1. **Paint:** The use of lead in house paint at high concentrations was prohibited by 1978, but lead-based paint still exists in the interior and exterior paint of many older buildings in Hawai'i.
2. **Gasoline:** Lead in gasoline was phased out in the 1980's and was completely banned for use in motor vehicles in January 1996, but decades of leaded gasoline use has contaminated soils adjacent to highways and roads.
3. **Industrial Sources:** Lead can be emitted into the environment through industrial sources such as historic or ongoing mining and smelting operations that can cause substantial lead contamination to the site and surrounding area.
4. **Consumer Products:** Lead has been used in a wide variety of consumer products found in and around our homes, including plastics, ceramics, pipes and plumbing materials, solder, batteries, ammunition, toys, jewelry, and cosmetics.

Lesson 2: Sources of Lead in Hawai‘i

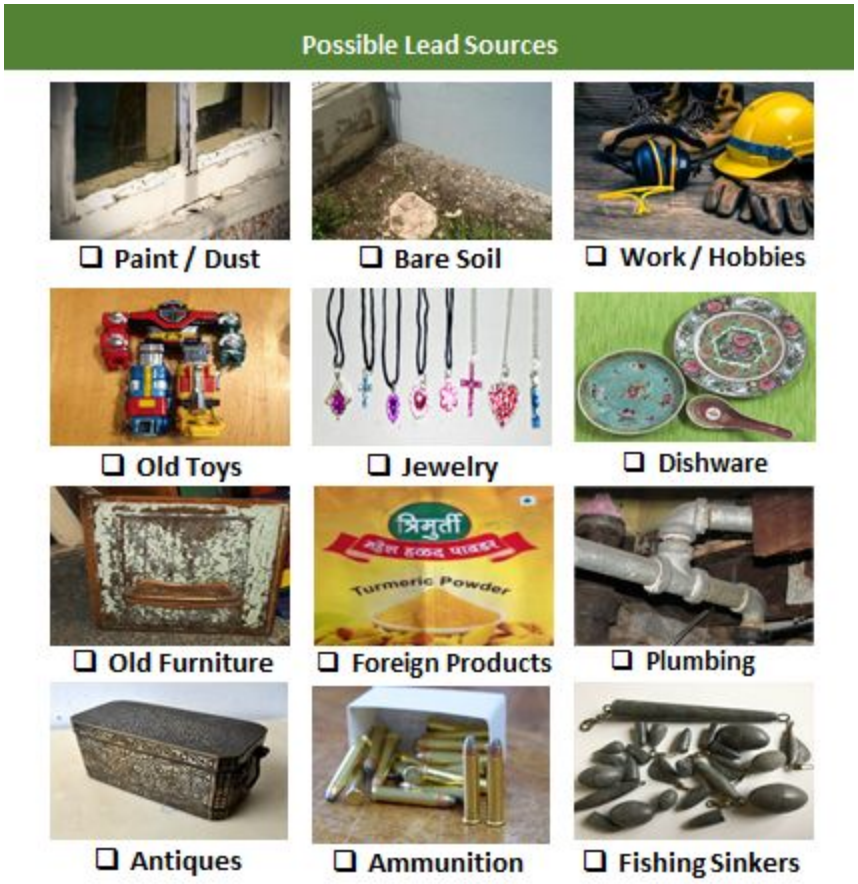
Lesson 2 Overview

Protecting children from exposure to lead is vital for lifelong health. There are many potential sources of lead exposure in Hawai‘i. The most common sources include lead-based paint in homes built before 1978, contaminated soil, and lead brought home by family members with jobs and hobbies involving lead.

Objectives

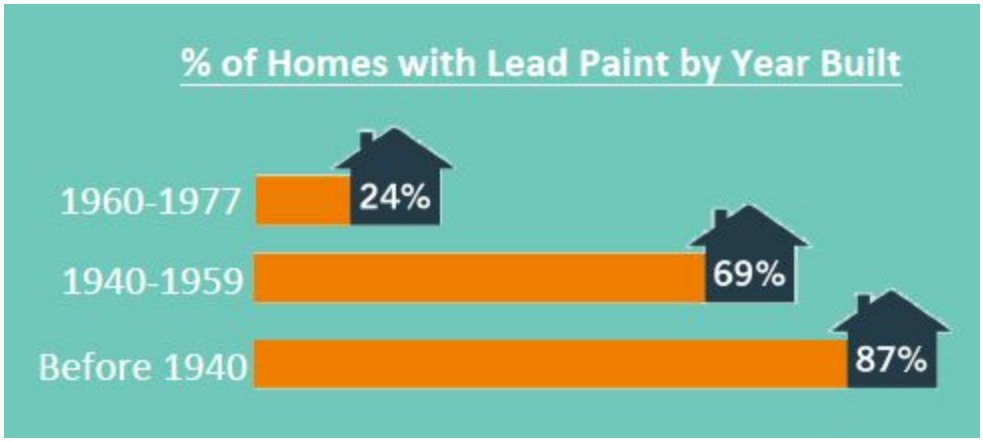
At the end of this lesson you will be able to:

- Identify possible sources of childhood lead exposure in Hawai‘i.



Topic 1: Lead-Based Paint

> **Lead-based paint** is the most common source of childhood lead exposure.



Homes built before 1978 may have lead paint. The older the home, the higher the risk. Painted walls, floors, ceilings, window sills, furniture, and even antiques or items purchased at a yard sale could be contaminated with lead paint. When this paint starts to fall apart, peel, or flake, it can introduce lead into household dust that is easily ingested or inhaled by young children.

Friction surfaces like painted windows and doors that rub together or stick can create lead dust even if other painted surfaces appear to be in good condition. Children can also be exposed to lead-based paint outside of their home in places they visit often such as a child care facility, preschool, or a family member's home.

Renovations and repairs to homes containing lead-based paint present a significant risk to children. Do-it-yourself home repairs often result in cases of lead poisoning because the work exposes families to lead debris and dust that are not contained or cleaned up properly. For this reason, families with young children living in older homes should have their home tested for lead before beginning any repairs that disturbs paint, and ideally hire a professional who is certified in performing lead-safe work. Whether families do the repairs themselves or they hire someone else, lead-safe work practices should always be used when lead-based paint is either suspected or confirmed.

Topic 2: Soil

> Historic use of leaded paint and gasoline in the United States has caused the **contamination of today's soil**.

Lead does not degrade in soils and can be dispersed through natural or human disturbances or transported by erosion to adjacent areas.

Soil around the perimeter of buildings can become contaminated with lead as paint chips off of exterior walls and falls to the ground. In addition, some types of older roofing nails may contain lead. When they fall to the ground, lead can be released from the nails and contaminate the soil. Soil from homes and buildings located or built adjacent to historic highways and old roads can also be contaminated from residual leaded gasoline fumes.

Unintentional ingestion of contaminated soil is the primary source of exposure to lead in soil. Dirt on hands from normal play activities, working in a garden, or residual dirt on produce grown in gardens can result in accidental ingestion of contaminated soil. Soil can also be carried into the home on hands, shoes and clothing, or as airborne dust. Once inside the home, the contaminated soil can be deposited on floors, furniture, toys, stuffed animals and other objects that children come into contact with.

See HI-CLPPP's Clean Soil Fact Sheet for more information about how to prevent exposure to lead contaminated soil from yards, gardens, and produce.

Topic 3: Water

> Lead contamination in water is most common in homes built before 1988. Typically, **lead contaminates water through corrosion of plumbing products containing lead**.

The most common sources of lead in plumbing products include pipes, solder, fixtures, fittings, and valves. Contamination is not just from lead pipes. Other sources include copper pipes joined with lead solder and brass pipes and fixtures.

Homes or buildings built before 1988 could still contain leaded plumbing products and are at the highest risk for lead contaminated water. By 1988, “lead-free” materials were required to be used in both new plumbing and plumbing repairs. However, “lead-free” materials may still contain lead. The definition of “lead-free” was set at no more than 8% from 1988 to 2013, and no more than 0.25% beginning in 2014. In addition, plumbing not intended for drinking like garden hose faucets and pipes used for outdoor irrigation are exempt from lead regulations and may contain unknown amounts of lead.

Water catchment systems can also pose a lead exposure risk. In vog prone areas, such as Hawai‘i, water from catchment systems can become acidic and leach harmful contaminants from the roofing or plumbing products, including lead.

You cannot taste, see, or smell lead in drinking water so families should take certain actions to minimize their exposure. Before using any tap water for drinking or cooking, it is recommended to flush the water system by running cold water for 1-2 minutes. Water used for drinking, cooking, and making formula should only come from the cold water tap because hot water increases the leaching of lead from plumbing products. Families can also reduce their exposure to lead in drinking water by using a water filter that removes at least 99% of lead.

Topic 4: Jobs and Hobbies

There are a variety of jobs and hobbies that involve contact with lead.

> **Lead dust** can be carried from a person's job or hobby on their skin, clothes, and shoes and can contaminate a person's car, home, and furniture.

Jobs and hobbies that can expose families to lead include:

- Working in construction and at firing ranges
- Working as a painter, plumber, welder, or mechanic
- Home remodeling and refinishing furniture
- Making stained glass, pottery, jewelry, or lead fishing sinkers

Whether it's a parent, relative, or child care provider, anyone who works with lead should take precautions to prevent accidentally bringing home lead dust and exposing young children. Precautions include:

- Showering and changing clothes before coming home, getting in a car, and interacting with young children
- Taking shoes off before coming inside to avoid tracking in lead dust and debris
- Washing clothing items that may be contaminated with lead dust separately from the rest of the family's clothing

For a list of occupational, recreational, and environmental sources of lead, view: Everyday Sources of Lead.

Topic 5: Fishing Sinkers

Lead fishing sinkers are commonly used and made in Hawai'i as a job or hobby. Family members working with the sinkers can easily bring lead into the home with them on their hands or clothes, putting young children at risk for exposure.

> Family members with **jobs and hobbies involving lead need to take precautions** to avoid exposing children to lead.

Lead fishing sinkers should never be made inside the home, and lead fishing sinkers kept on the property should be stored away and out of reach of young children.

Families can also take additional precautions by practicing good hygiene. Family member's making or using lead fishing sinkers should always shower before coming inside and wash their clothes separately. Children who do come in contact with lead fishing sinkers should wash their hands and face immediately to avoid ingesting lead dust.

Topic 6: Ceramic Dishware

> **Lead can also be found in glazes and decorations** covering the surface of some plates, bowls, mugs, and glasses.

Hawai'i is home to families with many different cultural backgrounds, who may use traditional dishware like the ones in these pictures. Using these dishes to prepare, store, or serve food and drinks can expose a family to lead.

Types of dishware that may contain lead and are not 100% safe include (Slides):

- Imported dishes not labeled for sale in the US
- Dishes with raised decorations that you can feel with your hand on top of the glazed surface
- Brightly colored dishes like orange, red, and yellow, but lead can be in any color dishware including white
- Leaded crystal
- Antiques, china, and items passed down from family
- Dishes from thrift stores, garage sales, and street vendors
- Handmade dishes with a crude appearance or irregular shape
- Dishes with damage like worn eating surfaces, chips, scratches
- Dishes with warning labels - Not for Food Use or CA Prop 65

Families can take precautions to avoid exposing themselves to lead-containing dishware by using dishes that are **free of damage, have been tested for lead, and are labeled lead-free.** The label of lead-free is important. Dishes labeled lead-safe means the item will not leach out lead unless the glaze is defective or the item is damaged, but lead-free means the items contain no amount of lead.

Topic 7: Foreign Products

> **Traditional (folk) remedies, cosmetics, and imported spices/food/candy** bought in other countries and specialty grocery stores may contain lead.

Lead can be found in foreign products for a variety of reasons. Sometimes lead is added into products on purpose to manipulate qualities like weight and color. Other times lead may be introduced into products on accident during manufacturing processes like grinding, coloring, and packaging.

Some **folk remedies** used by South Asian, Middle Eastern, West Asian, and Hispanic cultures have been found to contain lead and other heavy metals. These metals have been found in powders and tablets given for arthritis, infertility, upset stomach, menstrual cramps, colic, and other illnesses. Some folk remedies known to contain lead include:

- Indian powder: Sindoor (Red or red-orange)
- Mexican powders: Greta (yellow) and Azarcon (bright orange) - These have been found to have lead content as high as 90%.
- South Asian powder: Ghasard (brown)
- Chinese powder: Ba-baw-san (brown)
- Southeast Asian powder: Daw tway (brown)

Powders typically used as **cosmetics** or in religious ceremonies have also been found to contain lead. Some of these products include sindoor, kohl, surma, henna, and ceruse. These powders are not typically intended for food use. However, children can be easily exposed to these products through touching cosmetics or ceremonial powders on their body or a family member's body and then putting their hands in their mouth.

Food products bought in other countries and specialty grocery stores are at high risk for lead contamination due to the spices and other ingredients they contain. Some **imported spices** found to contain high lead concentrations include turmeric, curry powder, paprika, carraway, and fenugreek. **Candies** containing tamarind and chili powder, and those imported from Mexico, Malaysia, China, and India also have a higher likelihood of containing elevated levels of lead. Ink from plastic or paper candy wrappers may also contain lead that leaches or seeps into the imported candy.

You cannot tell if a food, candy, spice, medicine or cosmetic contains lead by looking at or tasting it. The only way to know is to have these products tested in a laboratory. Brightly colored folk remedies, cosmetics, and spices (red, orange, yellow) usually contain the highest amount of lead. To prevent ingestion of lead from foreign products, families should avoid buying and using products originally labeled for sale in a foreign country.

Topic 8: Toys & Children's Products

> **Toys and children's products** made before 2010, bought used, or passed down from friends or family put children at risk for lead exposure.

Toys and children's products manufactured before 2010 may contain lead and other harmful substances. Safety standards for toys and children's products were voluntary until the passage of the Consumer Product Safety Improvement Act (CPSIA) of 2008, and third-party testing of these products did not become a requirement until August 2009.

The U.S. Consumer Product Safety Commission (CPSC) issues recalls of children's toys that contain lead. Families should check for possible recalls of their children's toys and take the toys away immediately if they have been recalled.

Metal and plastic toys, especially **older imported toys**, **toy jewelry** and **antique toys and collectibles** may contain lead. Metal toys can be made of lead, and lead is used in paints and pigments on some toys. Lead is also used as a stabilizing agent in plastic. Plastic in toys exposed to sunlight can degrade and form lead dust.

Toy jewelry containing rhinestones, jewelry from **vending machines**, and **costume jewelry**, not intended for children can also be unsafe. A child will not be poisoned by wearing toy jewelry. However, if swallowed or put in their mouth, lead jewelry becomes a hazard.

In July 2004, CPSC recalled 150 million pieces of metal toy jewelry sold in vending machines. The recall was in response to a child becoming ill after swallowing a piece of jewelry from a vending machine.

Lesson 3: Blood Lead Testing

Lesson 3 Overview

The only way to know if a child has been exposed to lead is by getting a blood lead test. Testing children for lead at ages 1 and 2 is crucial because any amount of lead found in a child's blood requires action to identify and remove the exposure source from the child's environment**.** Early testing also helps link children to early education and other needed services which can help reduce the effects of lead exposure and promote healthy development.

Objectives

At the end of this lesson, you will be able to:

- Understand the units used to measure blood lead.
- Explain the difference between the two types of tests used to collect blood lead samples.
- Identify and understand the Centers for Disease Control and Prevention's (CDC) Blood Lead Reference Value.
- Recognize when children should receive a blood lead test.
- Understand blood lead testing rates and recommendations for young children in Hawai'i.

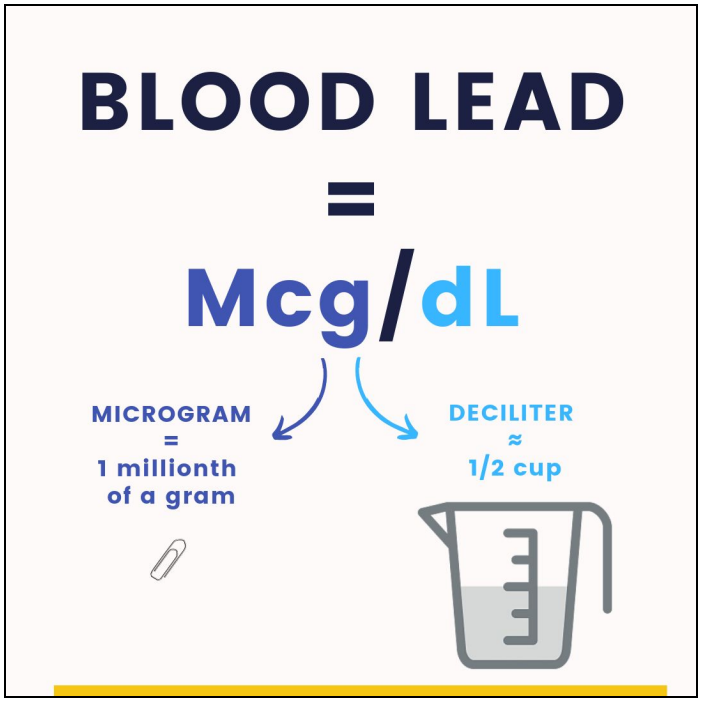
Topic 1: Measuring Blood Lead Levels

> **Blood lead** is measured in units called micrograms per deciliter (mcg/dL).

A **microgram** is a unit of weight. There are one million micrograms in one gram.

A small paper clip weighs about one gram. If you were to split a paper clip into one million pieces, one of those pieces would be the weight of a microgram.

A **deciliter** is a unit of volume and is equal to one tenth of a liter, or a little less than half a cup.



Examples of Blood Lead Levels:

1. An average newborn has 1 cup of blood in their body, so a blood lead level of 1 mcg/dL in a newborn would be approximately two-millionths of a gram of lead in their bloodstream.
2. An average child weighing around 40 lbs will have roughly 16 cups of blood in their body. In this case, a blood lead level of 1 mcg/dL would be approximately thirty-two millionths of a gram of lead in the bloodstream.

Although a blood lead level of 1 mcg/dL may seem small, **no amount of lead in the body is considered safe for young children.**

Topic 2: Collecting Blood Lead Samples

> There are two types of tests used to collect blood lead samples: (1) **Capillary** and (2) **Venous**.

1. **Capillary:** Capillary testing, also known as a fingerstick, is often used for a child's first blood lead test. This type of testing is useful because it is quick and easy to do. However, capillary testing is prone to false positive results because the samples can be easily contaminated. Contamination of a child's blood sample occurs when there is residual lead dust on a child's fingertips and 1) their hands are not cleaned properly before testing or 2) children re-contaminate their washed hands by touching their clothes or other surfaces that may be coated with lead dust.

2. **Venous:** Venous testing is a blood draw from a vein and is used to confirm elevated capillary results. Venous testing is less prone to contamination and is a better indicator of a child's actual blood lead level.

Blood lead tests are ordered by a child's primary care provider (PCP). Once ordered, families are responsible for taking their child to a laboratory for the blood lead draw. Some labs are connected to the PCP's office, and other times families must take their child to an outside lab.

Topic 3: When to Get a Blood Lead Test

#1 Children Enrolled in Medicaid/QUEST

All children living in Hawai'i that are enrolled in Medicaid/QUEST are required to receive blood lead tests at:

- Ages 9-12 months and 2 years of age: Children must receive **both** tests
- Ages 24-72 months if a child has never been tested: Requires **1** catch-up test

In addition, children should be re-tested at any age if their risk for lead exposure changes. Two examples of a change in lead exposure risk would include a child whose family moves into a home built before 1978 or a child with a parent who begins working in construction. Both of these changes put a child at higher risk for lead exposure.

#2 All Hawai'i Children

The Hawai'i Childhood Lead Poisoning Prevention Program (HI-CLPPP) recommends that all children living in Hawai'i be tested for lead at 12 and 24 months of age and later if their risk for lead exposure changes or they have never been tested.

> **Download** and have families **complete** HI-CLPPP's Lead Risk Screening Questions to assess their child's level of risk.

Questions are based on known risk factors for lead exposure, and also include questions based on trends in elevated blood lead cases in Hawai'i. Families should bring the completed form to their child's next well child visit and discuss the results with their child's doctor to determine if they need a blood lead test.

Topic 4: Blood Lead Testing in Hawai'i

> An elevated blood lead level in children is **≥ 5 mcg/dL.**

Children with blood lead levels of 5 mcg/dL or higher have more lead in their body than 97.5% of other children in the United States. The Hawai'i State Department of Health uses this level set by the Centers for Disease Control and Prevention (CDC) to trigger public health follow-up and case management services. However, it is important to stress that **no safe blood lead level in children has been identified**.

All Hawai'i Children

In 2017, 195 children under age 6 were identified as having an elevated blood lead level, and in 2018, 160 children were identified. For more information, see the chart (Number of Children in Hawai'i Under Age 6 who Tested with Elevated Blood Lead Levels (BLL ≥ 5mcg/dL) below from the Hawai'i State Department of Health - HEER/HI-CLPPP:

Number of Children in Hawaii Under Age 6 Who Tested with Elevated Blood Lead Levels (BLL ≥ 5 mcg/dL)

	2013	2014	2015	2016	2017	2018
5 - 9 mcg/dL	78	66	120	205	152	127
10 - 14 mcg/dL	8	17	11	16	30	19
≥ 15 mcg/dL	7	8	8	13	13	14
Total # tested children with elevated BLL	93	91	139	234	195	160
Total # tested children	7,513	11,862	17,525	16,073	15,750	16,539
% tested children with elevated BLL	1.2%	0.8%	0.8%	1.4%	1.2%	1.0%

- Certain lead tests from 2014 to 2017 were reported to provide inaccurately low venous results.

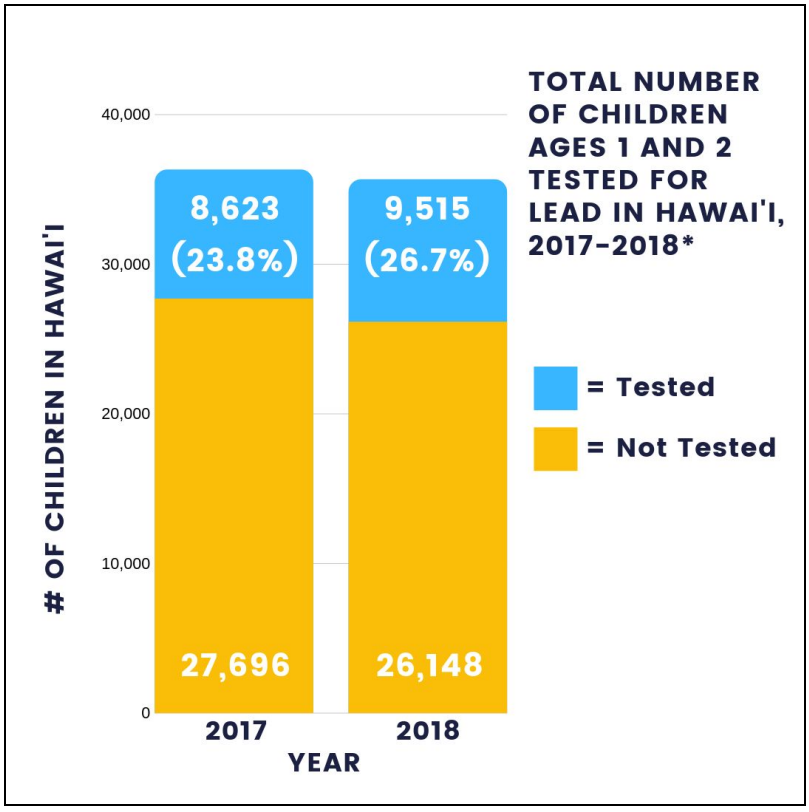
Source: Hawaii State Department of Health – HEER / HI-CLPPP

There is a lack of blood lead testing being done for **all children** living in Hawai'i. Lack of testing is the result of many factors, some of which include:

- Lack of a universal lead testing law in Hawai'i
- Lack of knowledge about lead poisoning and blood lead testing
- Inability to reach families in remote areas
- Children not having a primary care doctor or health insurance
- Inconvenience of going to an outside laboratory

Of all 1 year old and 2 year old children living in Hawai'i, only **23.8%** (8,623 out of 36,319 children) were tested in 2017, and only **26.7%** (9,515 out of 35,663 children) were tested in 2018.

See the graph below:



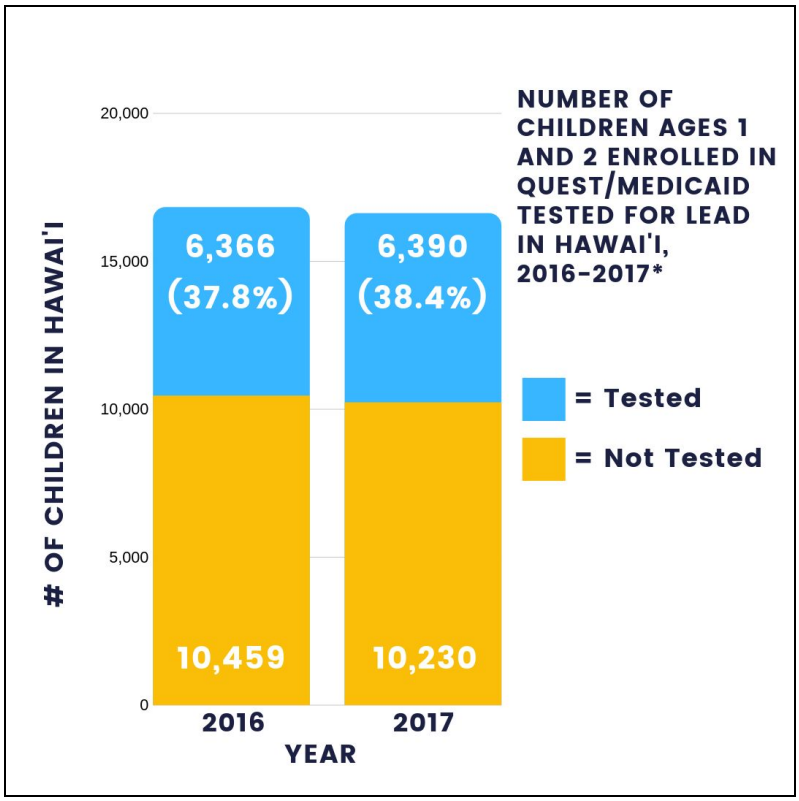
Using Hawai‘i Testing Data and American Fact Finder Estimates

- Numerator - Lead Tests in Hawai‘i 2018 for Children ages 1-3 - deduplicated
- Denominator - American Fact Finder Estimates for Hawai‘i - 2017 – Ages 1, 2

Hawai‘i children enrolled in Medicaid/QUEST

Of all 1 year old and 2 year old children in Hawai‘i with QUEST/Medicaid insurance (who are required by federal law to be tested) only 37.8% (6,366 out of 16,825 children) were tested in 2016, and 38.4% (6,390 out of 16,620 children) were tested in 2017.

See the graph below:



Using Form CMS-416 (Annual EPSDT Participation Report) for fiscal years 2016 and 2017

- Numerator - Eligibles Who Should Receive At Least One Initial or Periodic Screen
- Denominator - Total Blood Lead Tests

Why should we work towards getting all children tested for lead in Hawai'i?

In addition to keeping our keiki healthy and thriving, increasing the number of children who receive blood lead testing will also help improve the quality of Hawai'i's statewide blood lead data. HI-CLPPP will be able to analyze and track trends in elevated blood lead cases such as geographic location and type of lead exposure sources. These trends can be used in the future to help target and serve Hawai'i's most at-risk populations of children.

Lesson 4: Symptoms of Lead Poisoning

Lesson 4 Overview

Lead exposure at any level can cause harm to a child's health and brain development. Most children will not show signs of lead poisoning right away, and those who do have symptoms may present differently than other children with the same blood lead level. Damage caused by lead poisoning may be permanent and long-term effects can have a direct impact on a child's entire life.

Objectives

At the end of this lesson, you will be able to:

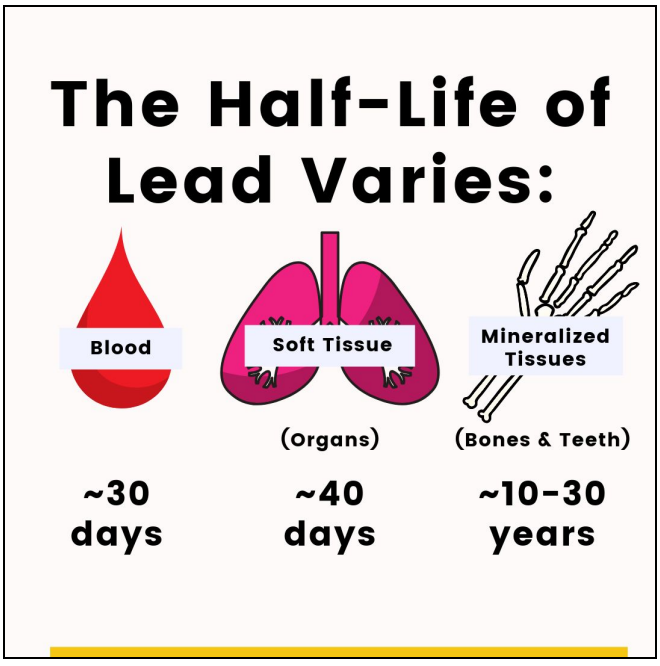
- Explain how lead works in the body.
- Describe the factors that influence lead absorption.
- List signs and symptoms of childhood lead poisoning.
- Understand the future implications of childhood lead exposure.

Topic 1: Lead in the Body

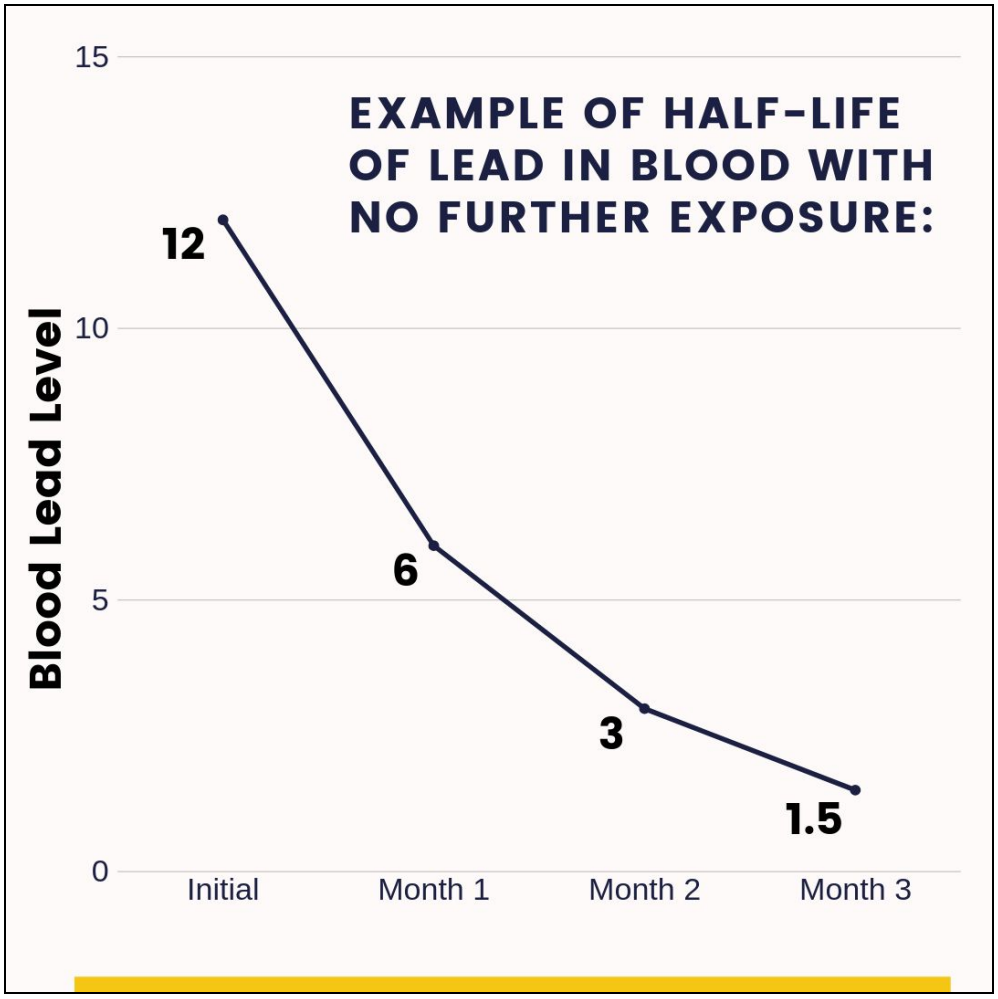
> **Lead exposure** is caused by swallowing or breathing in lead from the environment.

Once lead enters the body, it is absorbed into the bloodstream and either circulates, or is deposited into vital organs like the brain, liver, and kidneys, or mineralizing tissues like teeth and bones. This occurs when crucial minerals like iron, calcium, and zinc are depleted which allows lead to compete with and replace them in the body. During times of stress like growth spurts, fracture healing, and pregnancy, lead stored in these tissues is remobilized back into the bloodstream where it is filtered through the kidneys or liver and is excreted. Circulation and deposition of lead in the body is a continuous cycle that occurs until lead is totally excreted.

Lead has a 28-day half-life, but can persist in the body for longer. Half-life is the time required for a child's blood lead level to reduce to half its initial value. However, significant drops in a child's blood lead level may take several months, and sometimes years, even in the absence of further exposure because lead stored in bones and teeth can last for decades.



Below is an example of the half-life of lead in blood with no further exposure:



Approximately 70% of lead is stored in a child's teeth and bones. This number jumps to roughly 90% in an adult. During pregnancy and breastfeeding, lead can be released from the mother's bone stores. Therefore, women with a current or past history of lead exposure can pass lead onto their unborn baby or breastfeeding infant. When children and pregnant women have poor diets, more lead is able to be stored in bones and teeth.

Topic 2: Factors Influencing Lead Absorption

> The factors that influence how much lead a child may absorb include their **developmental stage**, the **route of exposure**, the **lead content of the source**, and the child's **nutritional status**.

#1 Developmental Stage: Children under 3 years of age are more prone to putting their hands, toys, and other objects that may be contaminated with lead into their mouth. As children grow older, they discontinue behaviors that put them at more risk. However, children with developmental delays that prolong this mouthing behavior may remain at-risk until a later age.

Unborn babies can absorb between 85-90% of maternal lead because lead in the blood passes through the placenta during pregnancy.

#2 Route of Exposure: Lead that a child inhales is almost always totally (100%) absorbed, whereas between 20-50% of ingested lead may be absorbed.

#3 Lead Content of Source: The more lead an object contains, the more lead is available to absorb.

#4 Diet: Children absorb more lead on an empty stomach and have higher nutritional needs to support optimal growth and development. In the presence of nutrient deficiencies, lead can compete with missing minerals such as **calcium** and **iron** in the body and replace them. Therefore, diets high in **calcium**, **iron**, and **vitamin C** can help decrease the amount of lead a child will absorb. High-fat, processed food diets should be avoided to ensure that children are receiving a well-balanced diet high in these vitamins and minerals.

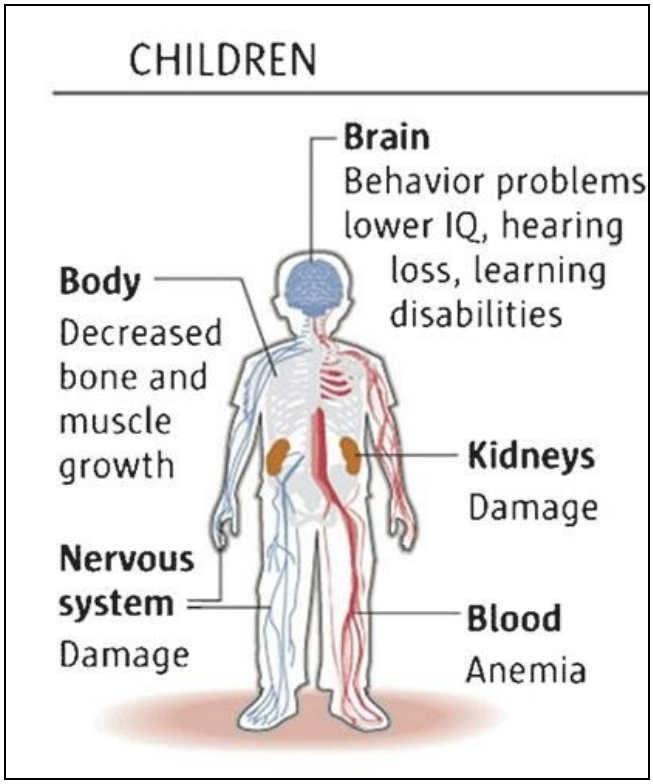
Example: During growth spurts and fracture healing, lead can be released from a child's bones instead of **calcium** during the process of bone healing. Calcium is also leached out

of bones during pregnancy and breastfeeding. In the case of **iron** deficiency, lead can bind to red blood cells at the iron binding site and cause anemia.

Topic 3: Signs & Symptoms of Lead Poisoning

> **The nervous system is the main target of lead toxicity.** However, lead can affect nearly every organ and system in the body.

Exposure to lead causes damage to a child's nervous system and brain.This may cause children to develop cognitive delays like hyperactivity, lowered IQ, and problems with learning and behavior. Kidney damage may also occur in childhood lead poisoning cases because approximately 65% of lead is cleaned and filtered out of the kidneys.



At higher blood lead levels, children may experience headaches, fatigue, gastrointestinal problems, loss of appetite, and weight loss.

Pregnant women with a past or current history of lead exposure are also at high risk and can pass lead to their unborn baby. Lead exposure during pregnancy can lead to miscarriage, preeclampsia, and preterm birth, causing birth outcomes such as low-birth weight, and reduction in body length, and head circumference. See HI-CLPPP's Lead and Pregnancy Handout for more information.

Topic 4: Future Implications

> **Even after the lead source is removed, the effects of childhood lead poisoning can follow a child throughout their life into adulthood.** For this reason, it is important to foster a lead-exposed child's curiosity to learn and track their development compared to other children their age.

Cognitive delays in early childhood can impact a child's future school success. Below is a chart comparing blood lead levels to childhood educational outcomes. Note the top two rows of this chart.

Table 1. Studies on Lead and Educational Outcomes

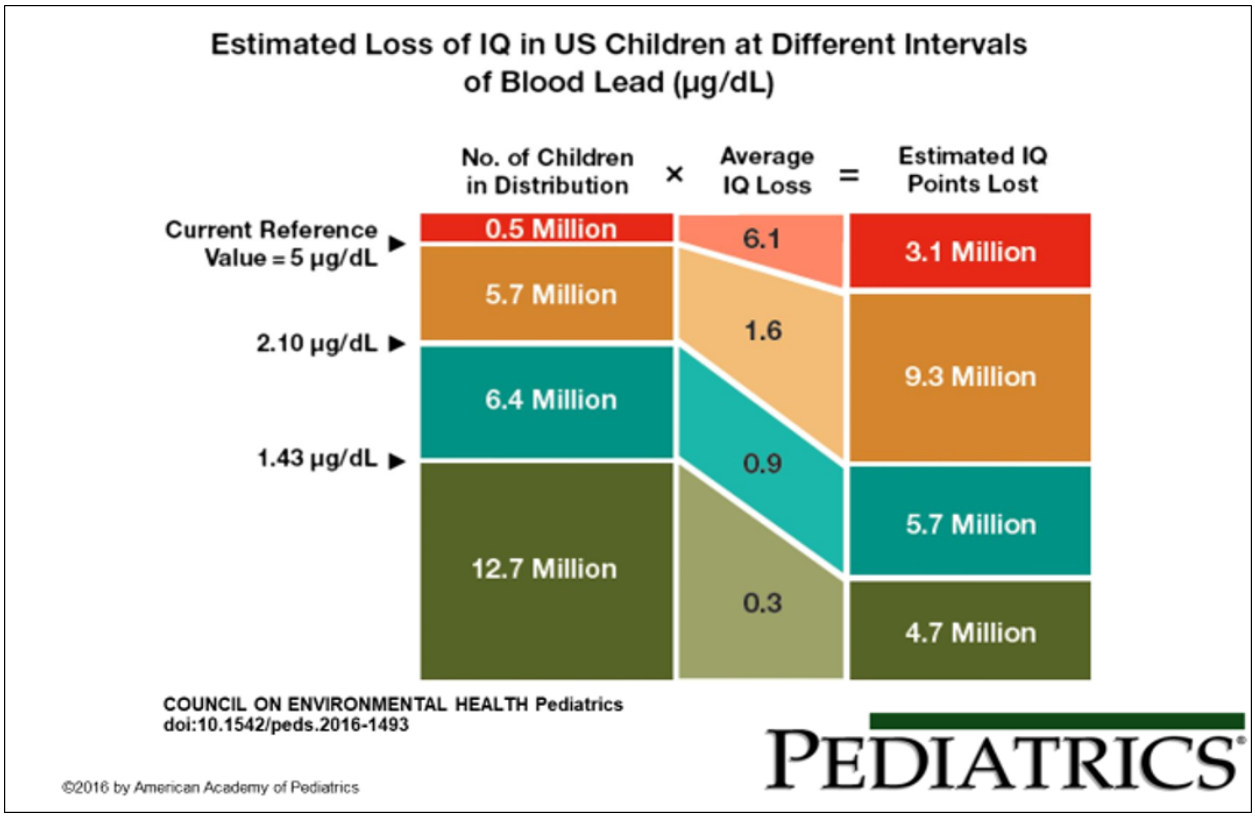
Blood Lead Levels	Educational Impact	Size of Study	Location of Study
≤ 3 µg/dL	Decreased end of grade test scores	More than 57,000 children	North Carolina (Miranda et al. 2009)[1]
4 µg/dL at 3 years of age	Increased likelihood learning disabled classification in elementary school	More than 57,000 children	North Carolina (Miranda et al. 2009)[1]
	Poorer performance on tests	35,000 children	Connecticut (Miranda et al. 2011)
5 µg/dL	30% more likely to fail third grade reading and math tests	More than 48,000 children	Chicago (Evens et al. unpublished data)
	More likely to be non-proficient in math, science, and reading	21,000 children	Detroit (Zhang et al. 2013)
5-9 µg/dL	Scored 4.5 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013)
≥10 µg/dL	Scored 10.1 points lower on reading readiness tests	3,406 children	Rhode Island (McLaine et al. 2013)
10 and 19 µg/dL	Significantly lower academic performance test scores in 4th grade	More than 3,000 children	Milwaukee (Amato et al. 2012)
≥ 25 µg/dL	$0.5 million in excess annual special education and juvenile justice costs	279 children	Mahoning County, Ohio (Stefanak et al. 2005)

Source: Educational Services for Children Affected by Lead Expert Panel. Educational Interventions for Children Affected by Lead. Atlanta: U.S. Department of Human Services, 2015

Studies have found that blood lead levels less than 3 mcg/dL can still have negative impacts on a child's school performance. Children in this category were still at risk for poor

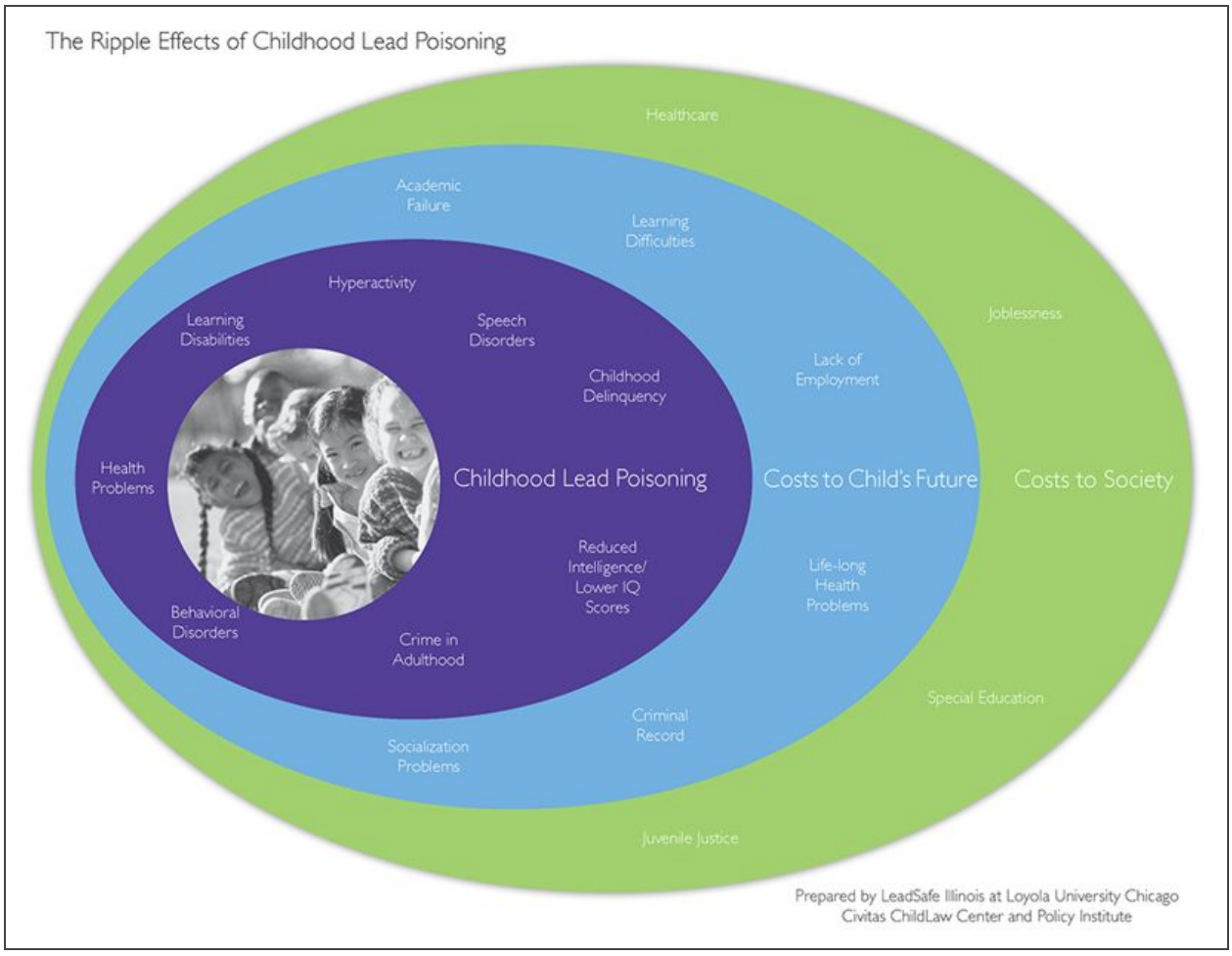
performance on school tests and had an increased likelihood of needing special education in elementary school. Studies have also found that as children's blood lead levels increase, declines in educational outcomes become more significant. This confirms that blood lead levels below the CDC Blood Lead Reference Value of 5 mcg/dL are still unsafe for children.

Blood lead's impact on educational outcomes can be further explained by this chart showing the estimated loss of I.Q. points in U.S. children at varying blood lead levels.



Impacts to a single child's IQ points are most pronounced among those with blood lead above the CDC reference level (an average loss of 6.1 IQ points per child), but the overall impact in total IQ points lost to lead exposure is highest among the millions of children who had blood lead levels under 5 mcg/dl (an estimated 19.7 million lost IQ points attributable to lead). Remember, the only safe level of lead is NONE.

Problems associated with childhood lead poisoning that are not addressed early can follow a child into adulthood.



Children who are exposed to lead are at higher risk for unemployment, problems with socialization, and developing a criminal record in adulthood. Therefore, finding the source of a child's lead exposure and addressing developmental delays should be a high priority. Early detection and intervention can help mitigate or prevent the progression of health, learning, and behavioral problems in children exposed to lead, giving them a brighter future.

There are a variety of resources available that help promote children's optimal development. See list the of state and community resources at the end of this course.

Lesson 5: Education & Tools For Prevention

Lesson 5 Overview

When a child is exposed to lead, the only way to lower their blood lead level is to get rid of the exposure source and keep lead out of their environment. The next step is continuous blood lead level monitoring to make sure the child's lead level is declining and routine developmental screenings to make sure they are on track for school success. This lesson will cover strategies families can use to create a lead-free home environment, as well as tips to keep their keiki lead-free and thriving.

Objectives

At the end of this lesson, you will be able to:

- List strategies that help prevent and reduce lead in a child's environment.
- Understand the process of getting a blood lead test.
- Explain ways to promote a child's school readiness.
- Understand how to test paint, soil, and water for lead and how to get rid of it.

Topic 1: Creating a Lead-Free Home Environment

> The most effective strategies a family can implement to create a lead-free home environment are (1) **getting rid of potential source(s) of exposure** and (2) **adopting lead-safe cleaning and lifestyle practices that reduce household lead dust**.

#1 Getting Rid of the Source

When determining where a child may be exposed to lead, consider potential lead sources in a child's home as well as places the child visits frequently such as a daycare, preschool, or a friend, neighbor or family members' home. Lead dust may also be hiding in someone's car if they have a job or hobby that involves using lead.

- If sources of lead are found **in a child's home,** families should get rid of the source or store it out of the child's reach. Lead-safe cleaning measures should also be used to ensure their home is free of lead dust and residue. Lead from sources such as lead-based paint, contaminated soil or water require more work to remove. *Continue on to Topic 4 and 5 of this lesson to learn about how to test for lead in paint, soil, and water and how to get rid of it.*
- If the exposure source is coming **from outside of the child's home**, it is advised that families keep children away from this possible source until it has been positively identified. Families should inform the Hawai'i Department of Health (DOH) if they have suspicions about a potential lead source from a neighbors home or child care center.

Without testing different sources in the child's environment, it can be hard to determine where the source of a child's lead exposure is coming from. However, if a child's blood lead level starts to decline after the removal of a potential source, families may have found one exposure source, and should continue to monitor their child's blood lead level. For help finding the lead source, contact HI-CLPPP at 808-733-9055.

#2 Cleaning and Lifestyle Practices

Young children tend to play on the ground and put their hands or other objects that may be contaminated with lead into their mouth. For this reason, it is important to keep a child's environment lead-free.

Wash Hands

Families should wash their child's hands and face after playing outside and before eating to prevent their child from ingesting lead dust. Toys, pacifiers, teethers, stuffed animals, and other objects that children put in their mouth should be washed regularly. Family members should also wash their hands regularly throughout the day, especially after working in the yard, garden, or after touching lead-containing products or items.

Keep the House Clean!

The older a home is, the more likely it contains lead. Lead dust is created when painted surfaces like windows or doors bump or rub together, and when paint cracks, peels, or is disturbed during home repair.

To avoid spreading lead dust at home, families should use specific cleaning measures:

- **Hard floors** should be cleaned using a disposable or washable wet mop, an all-purpose floor cleaner or soap and water, and a two bucket (wash bucket and rinse bucket) mopping method. When water in the wash or rinse bucket becomes visibly grey or dingy, it should be refilled to prevent reintroducing contaminated water back onto the floor.
- **Hard surface items** such as walls and windowsills can be wiped down with soap and water or an all-purpose cleaner. Rags, paper towels, and cloths used for cleaning should be discarded after use.
- **Carpeted floors and fabric furniture** should be cleaned using a vacuum with a "HEPA" or "Allergy" filter bag. Vacuum slowly and thoroughly and vacuum from both directions to cover the same area at least twice. Dispose of the vacuum bag or filter after use. Steam cleaning can also help to remove lead from carpet.

- **Clothing and other soft items** such as curtains, bedding, and toys can be machine washed separately from non-contaminated items and an extra rinse cycle should be run afterwards to prevent spreading lead dust to other items.
- Avoid tracking soil into the home by leaving **shoes and slippers** outside and using door mats. Family pets can also track in lead from contaminated soil on their fur and paws. Clean up right away if soil is tracked inside.
- **Areas of peeling paint** also need special care. Be sure to keep all paint in excellent shape and clean up dust frequently. If the paint in a home tests positive for lead or families suspect that their home contains lead-based paint, they should call the DOH - Lead-Based Paint Program at 808-586-5800 for more information. They can provide a directory of consultants and contractors who are certified by the EPA and the State of Hawai'i to remove or stabilize lead-based paint safely. In the meantime, young children and pregnant women should be kept away from chipping and peeling paint and areas of home repair and construction.

Limit Soil Exposure

Yards and home gardens can contain contaminated soil, putting children at high risk for swallowing lead. To prevent this from occurring, children should be kept away from areas of bare dirt. Families can also maintain dense landscaping, gravel, or permanent cover, such as concrete close to building foundations, roads, and driveways to prevent children from playing in soil where higher contaminant levels can be found. In addition, families who have a home garden or plan on starting one should follow these guidelines:

- Use planter boxes or raised garden beds if you home garden has not been tested and use soil that has been commercially packaged and labeled for growing food crops. A permeable geotextile fabric can be used between the untested soil and the overlying clean soils to ensure the two layers don't mix.
- Plant gardens at least 10 feet away from building foundations, roads, and driveways to avoid soil contamination from chipping exterior paint, roofing nails, and fumes from leaded gasoline.
- Do not use tires, single-use plastics, old railroad ties, treated wood, and other similar materials in your garden due to potential contaminants.

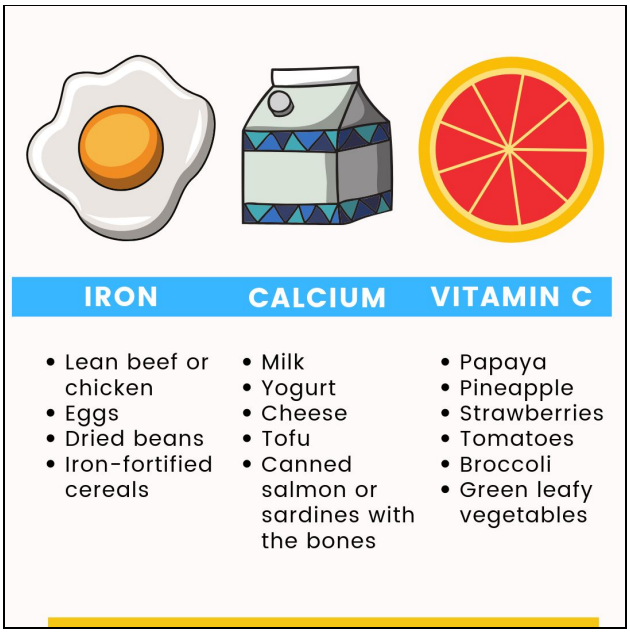
- Wash all fruits and vegetables from the garden with clean, running water before bringing them into the home, and again with 1% vinegar solution or soapy water to remove any remaining soil particles. Do not compost the produce peelings and unused plant parts for use back in your garden.

Use Cold Water

Run cold water for at least 30 seconds if the faucet has not been used for more than 6 hours. Do not cook, drink, or make children's formula from the hot water tap.

Provide Children A Healthy Diet

More lead is absorbed on an empty stomach, so children should be fed regular meals and snacks throughout the day. Foods and snacks rich in **iron**, **calcium**, and **vitamin C** are especially important because they help to decrease lead absorption. Iron-rich foods should be given with foods high in vitamin C to ensure that iron is completely absorbed. Processed foods like French fries, potato chips, bacon, or anything fried should be avoided.



Avoid Bringing Home Lead

Family members can be exposed to lead through certain jobs and hobbies that generate lead dust and fumes. You cannot see lead dust, but it can be carried home in a car or on clothes, shoes, skin, and hair. Recommendations to prevent bring home lead include:

- Avoid bringing personal items into your work area or taking work items home.
- Wear protective clothing at work so lead dust doesn't get on your clothes.
- Shower and change clothes before coming home or getting into your car, especially if it doubles as your family car.
- Bring work clothes home in a plastic bag and wash separately from the rest of your families clothes. Run an extra rinse cycle afterwards.

See HI-CLPPP's Prevent Take-Home Lead Fact Sheet for more information.

Renovate Safely

Work that disturbs old paint can create dangerous amounts of lead dust. To keep families safe during home construction, a **lead-safe certified contractor** should be hired. They are legally required to be trained and certified for lead remediation in homes built before 1978.

Families can also choose to do home repairs and renovations themselves. However, do-it-yourself home repairs should only be done by family members who have basic home repair skills and are experienced and knowledgeable about how to prevent the spread of lead dust. **Landlords** who do home repairs or renovations that disturb lead paint are required to use certified lead-safe firms or consultants if the home was built before 1978.

See Working With Lead Paint Fact Sheet for more information on how to renovate safely.

Topic 2: Blood Lead Testing

> The only way to know if a child has been exposed to lead is by getting a **blood lead test**.

All children should be tested for lead at **1** and **2** years of age. Children who did not receive a blood lead test at 1 and 2 should receive one catch-up test between ages 3 to 6. Testing should also be done at any age if a child's risk for lead exposure changes. Risk factors include moving into an older home, attending a child care or preschool facility located in an older building, and any changes to a family member's job or hobby that may expose them to lead.

Well-child visits are a great time to ask a child's doctor about blood lead testing, especially if the child is at high risk for lead exposure. Blood lead tests are ordered by a child's doctor, but the blood lead test is done at a laboratory. Depending on the doctor's office, families will either go to the lab connected to their doctors office or to an outside lab.

A child's first blood lead test is often a capillary (fingerstick) test because it is quick and easy to do. It is important to clean a child's hands well with soap and water before this type of testing is done. Capillary tests that come back elevated (≥ 5 mcg/dL) need to be followed-up by a venous (vein draw) test to confirm the result. Families will be notified by their child's doctor if there is a need for follow-up testing. Follow-up testing should continue until the child no longer has an elevated blood lead level.

Children are not the only ones at risk for lead exposure. Women should ask their doctor about a blood lead test before getting pregnant or at their first prenatal visit. Past or current maternal exposure can cause miscarriage, stillbirth, and babies being born too early and too small. In addition, adults who work in jobs involving lead should talk with their supervisor about getting routine blood lead testing or getting a blood lead test if their exposure to lead in the workplace changes in any way. Employers are required to protect workers from lead exposure under OSHA Lead Standards covering general industry, shipyards, and construction.

Topic 3: School Readiness

> The first years of a child's life are some of the most important in terms of **cognitive**, **social**, and **physical development**.

Skills such as taking a first step, smiling for the first time, and waving "bye bye" are called developmental milestones and children reach these milestones through how they play, learn, speak, act, and move. Lead-exposed children may not reach these milestones at the same pace as other children. However, families can help support their child's optimal growth and development by:

1. **Getting their child a developmental screen -** A developmental screen is a simple set of questions about what a child can do. The Hi'ilei Developmental Screening Program is a free resource for children birth to 5 years. The program provides FREE developmental screenings, information on community resources, and a list of fun development activities based on a child's individual needs. Families can complete a developmental screening online or receive a questionnaire by mail.

2. **Spending one-on-one time -** Families are a child's first and most important teacher. Therefore, it is important that families spend one-on-one time with their child and do fun activities that stimulate learning and development such as reading to their child, playing at the park, attending playgroups, and encouraging their child to use their imagination.

   According to the American American of Pediatrics (AAP), media use (except for video-chatting with family and friends) should be avoided for children under 18 months of age. After 18 months, families can slowly introduce their child to high-quality, educational programming like Sesame Street. Adults must be watching it with them to help them understand what they are seeing and apply it to the world around them. The AAP recommends no more than 1 hour of total screen time for children 2 to 5 years old.

3. **Providing stimulating experiences -** Reading to children every day is one of the best things a parent can do to support their child's development. Instead of just reading a book, families can involve their children by having them flip the book pages, having them point at the pictures, and asking them questions along the way. These tasks support different parts of a child's development in one fun activity!

4. **Enrolling their child in an early childhood education program -** The earlier children receive needed services, the more likely they are to reach their full potential. Early childhood education programs can help build children's cognitive, social, literacy, and verbal development by providing them with a rich and responsive learning environment. Program staff can also spot developmental delays and provide special attention and support to areas of developmental needs. See list of early childhood education programs under resources in Lesson 7.

5. **Meeting your family's basic needs -** Proper shelter, nutrition, and physical health are also important for a child's early development and learning. To assess whether basic needs are being met download HI-CLPPP's School Readiness Fact Sheet and answer the questions on the back page. For a list of available State and community resources see Lesson 7 or contact HI-CLPPP for assistance.

Topic 4: Testing for Lead

> **Testing for lead** should be considered if a family lives in or plans on moving into a home built before 1978, has or is planning to have children, or plans to renovate.

There are two ways to test for lead hazards:

#1 Hire A Contractor (Recommended)

The best way to find out whether there are lead hazards in a home or yard is to hire a Hawai'i State Certified Lead Inspector or Lead Risk Assessor. Call the DOH - Lead-Based Paint Program at 808-586-5800 for more information.

#2 Do-It-Yourself

When collecting your own samples, be sure to follow proper procedures outlined below. Lead test results are only as good as the testing procedures. The most important areas to test for lead are where children spend a lot of time, where there is chipping paint or bare soil, and/or where families plan to renovate. Wash hands and tools with soap and water after each sample collected. The samples will need to be sent to a laboratory for testing. A National Lead Laboratory Accredited Laboratory (NLLAP) is recommended. Call the laboratory ahead of time for more specific instructions on collection methods, mailing guidelines, and documentation.

1. **Paint Samples (Recommended)**: If there are layers of different colored paint, it is a good idea to collect each layer as separate samples. Tape a clean, plastic bag beneath the paint to be tested. Use a clean scraper or knife to scrape at least the size of a quarter amount of paint into the bag. Be sure to scrape off all the layers of paint, not just the top coat. Try not to get any drywall or wood that is under the paint in the bag. Seal the bag and label it with where the sample was collected (i.e. Sample #1 – bathroom wall).
2. **Paint Testing Alternative:** Lead test kits are commercially available at most paint and hardware stores. They contain swabs that change color when rubbed against a

surface that contains hazardous levels of lead. However, they may have high rates of false positives, indicating hazardous levels of lead are present when they are not. Make sure to follow the instructions on the package and be sure to test all layers of paint by using a clean knife to cut a small x-shape to expose all painted layers down to the bare surface before using the swab. Watch this video (Swab Demo on Painted Wood, Metal, Plaster and Drywall Surfaces) for instructions. If the swabs indicate that lead is present by changing color, it is a good idea to hire a certified contractor to confirm the results.

Lab Results: Paint is considered hazardous lead-based paint when it tests greater than or equal to 5,000 ppm (parts per million) or 0.5% by weight.

3. **Soil Samples:** Bare soil where a child frequents or plays should be the first to be tested. Use a large, clean trowel or spoon to scoop the top 1/2 inch layer of dirt (approximately 1 cup) into a clean plastic bag. Repeat this step 5-10 times across the area of soil you want to test. If there are paint chips in the soil, these are okay to include in the sample. Seal the bag and label it with where the sample was collected (i.e. Sample #2 – playground). Watch this video (How to collect a soil sample) for instructions or call the Hawai'i Department of Health Hazard Evaluation and Emergency Response Office at 808-586-4400 for advice on sampling, hiring a contractor, or choosing a laboratory.

   Lab Results: Soil is considered contaminated with hazardous levels of lead if it tests greater than or equal to 200 ppm on residential properties in Hawai'i.

4. **Water Samples:** To identify potential lead in fixtures, fill a 250mL bottle with water from a faucet you want to test after 8-18 hours of stagnation. To identify potential lead in pipes, fill a 250 mL bottle with water from the same faucet after flushing the tap for at least 30 seconds. Some water providers may routinely test your water. If they don't provide testing, contact a local accredited laboratory for instructions on specific collection methods, equipment, mailing guidance, and documentation.

Accredited laboratories in Hawai'i include Hawai'i Analytical Laboratory and the University of Hawai'i.

Owners of rainwater catchment systems should have water from their catchment system periodically tested to ensure safe water quality. DOH recommends performing and passing a screening test for *E. coli* bacteria, turbidity, and lead and copper using a laboratory certified or approved by the DOH to perform these drinking water analyses. A list of certified laboratories can be found at this link. In addition, DOH – Safe Drinking Water Branch currently subsidizes testing for lead and copper in individual homes served by rainwater catchment systems. Owners or tenants can use the program once per year and submit a water sample from their rainwater catchment system to a participating analytical laboratory for testing. AECOS Laboratory, Inc. is the currently approved participating laboratory. Call the DOH - Safe Drinking Water Branch for advice on proper catchment water sampling.

Lab Results: The American Academy of Pediatrics (AAP) recommends that the government take action to ensure school water fountains do not exceed 1 part per billion (ppb). The Food and Drug Administration (FDA) requires bottled water to be less than 5 ppb. The Environmental Protection Agency (EPA) is working toward developing a health-based standard for tap water, but it has not yet been released.

Topic 5: Removing Lead

> **If a lead hazard is identified**, a contractor can be hired to remove the lead hazard.

This option is recommended because they are legally required to be trained and certified for lead remediation (removal) in homes built before 1978. Families who decide to remove or reduce lead hazards themselves or are completing “do-it-yourself” renovations to an older home should follow these guidelines:

Paint

Families can take steps to minimize their families contact with lead dust if a home has chipping or deteriorating paint. These steps if completed properly and monitored regularly will temporarily stabilize the paint to keep it from creating dust. However, these steps will not remove lead-based paint from a home. Family members who decide to fix lead paint problems should make sure they have the right skills and equipment for each project. See Working With Lead Paint Fact Sheet for detailed instructions on how to work safely with lead paint.

REMEMBER:

- Keep children and pregnant or nursing women away from lead paint hazards and areas of home repair or renovation until surfaces are repainted and the area is fully cleaned.
- Failure to follow the detailed instructions provided within the Working With Lead Paint Fact Sheet may cause more lead dust to be released into a home.

Soil

If a family member or certified contractor identifies high levels of lead in the soil, there are a few actions that can be taken to reduce the risk of exposure to families. The best option is to hire a company to remove the top 1 foot of dirt. If this is not possible, families can use ground cover to reduce access to the soil. Rocks, mulch, plants, or grass can be placed or

planted on top of the contaminated bare soil to prevent exposure to lead dust. Children should be kept away from the soil if it is not removed or covered adequately.

Water

Water can be contaminated with lead if a home contains pipes made with lead, pipes joined with lead solder, and/or leaded fixtures. If pipes or plumbing are contaminating drinking water with lead, a plumber should be hired to replace them. If a home's fixtures or faucets are the cause of lead in drinking water, a contractor can be hired to replace the fixtures or families can replace them themselves. Use the following to interpret water sampling results:

- Water sample collected after 30 seconds or more of flushing contains high levels of lead: pipes or plumbing may be the source of the lead contamination.
- Water sample collected after 8-18 hours of stagnation contains high levels of lead: contamination source is likely the fixtures or faucets.
- Both samples contain high levels of lead: fixtures, faucets, pipes, and plumbing may contain lead.
- Both samples test negative for lead: lead was no detectable at the time the testing was performed.

Remember, a water sample will only test positive for lead if it's present during the time the sample was taken. All water systems slowly fall apart over time, and eventually plumbing may corrode and introduce lead into drinking water.

Poorly designed and maintained rainwater catchment systems are another source of contamination. DOH recommends that systems owners follow the recommendations listed in Guidelines for Rainwater Catchment Systems in Hawai'i. These guidelines provide information on proper building materials for water collection and storage, recommendations for system maintenance, and information on water treatment and testing options. In addition, precautions should be taken by rainwater catchment users during periods of increased volcanic activity. See Precautionary Measures for Residential Rainwater Catchment Users During Volcanic Activity for more details.

Lesson 6: Protocol & How To Implement (For Providers)

Lesson 6 Overview

As early childhood providers, you are advocates for the health and well-being of the children you serve. You play an influential role in families lives, and as such can help to educate and empower families of lead-exposed children or those at-risk of exposure.

This lesson will provide you with (1) A protocol that can be easily implemented into daily practice to help identify potential lead cases and (2) Ideas on how to incorporate education from Lesson 5 into conversations with families.

Objectives

At the end of this lesson, you will be able to:

- Implement the protocol into your daily practice to help identify children in your program that may be exposed to lead.
- Effectively incorporate lead poisoning and prevention information into conversations with families.

Topic 1: Protocol & How to Implement

Blood lead testing rates are low in Hawai'i. Only **26.7%** of all children ages 1 and 2 were tested for lead in 2018 and **38.4%** of children ages 1 and 2 enrolled in Medicaid/QUEST were tested in 2017. You can help increase the amount of children who receive a blood lead test in Hawai'i by using this 4 step protocol:

Step 1: Determine if child is at-risk: Depending on the setting in which you work, you can use screening questions, a visual survey of a child's home, or a combination of both to determine whether a child may be at risk for lead exposure.

- **Lead Risk Screening Questions:** HI-CLPPP's Lead Risk Screening Questions are a tool that can be used to help determine if a child is at risk for lead exposure or may already be exposed. Give the questionnaire out to each family you work with. We recommend giving the questions out on an annual basis or for any new children who enroll in your program. Always follow-up with families to make sure that they have filled out the questionnaire. If families answer "Yes" or "I Don't Know" to any of the questions, advise families to talk to their child's doctor about the need for a blood lead test.
- **Home visiting:** Use the information from this course to assess whether a child is at risk for lead exposure by doing a visual survey of their home environment. You can use Hi-CLPPP's Possible Lead Sources Fact Sheet as a checklist for your home visit.

Step 2: Provide education: If lead exposure is suspected, give families HI-CLPPP's Keep Your Keiki Lead-Free Brochure (available in 12 languages). It provides a general overview on cleaning, lifestyle practices, and diet modifications families can use to reduce their child's lead exposure. As an additional step, print out Lesson 5 and review it with families for an in-depth overview of prevention strategies, blood lead testing, and how to prepare their child for school. Families should also receive education on sources of lead exposure found in Lesson 2 of this course.

Step 3: Refer families to needed services: Poverty, food insecurity, and lack of medical insurance can affect early childhood outcomes and may impair a child's ability to succeed

in school and in life. Therefore, a needs assessment is necessary to determine whether a families basic needs are being met. Questions to ask include, but are not limited to:

- Does your child have medical insurance?
- Does your child have a doctor to go to when they get sick, need shots, or need a check-up?
- Does your family have stable housing?
- Do you need help buying clothing, groceries, or other essentials for your family?
- Do you have concerns about your child's learning, growth, or development?
- Do you worry about the cost of enrolling your child in an early childhood program?

In addition, children should receive periodic developmental screenings and be given referrals to educational and developmental services based on their individual needs. You can also give families HI-CLPPP's School Readiness Fact Sheet as a needs assessment or for information on 3 ways to get their child ready for school.

For ideas on where to refer families see list of resources in Lesson 7.

Step 4: Follow-up with families until the child is lead-free: Families may need additional support and guidance during the process of getting their child lead-free. You can help guide families through the process by ensuring that the following things have been met:

- ❏ Families have determined the source of their child's lead exposure and have gotten rid of it. If families need help finding the source, they can contact their child's doctor or HI-CLPPP.
- ❏ Families are applying cleaning and lifestyle practices outlined in Lesson 5 to reduce the amount of lead in their home.
- ❏ Families are continuing to monitor their child's blood lead level and it is progressively declining.
- ❏ Families are enrolled in needed services. Re-check to see if families needs any new referrals.
- ❏ Families are continuing to monitor their child's development to make sure no new or worsening developmental delays are present. Child is enrolled in early childhood education and development programs as needed.

Topic 2: How to Structure Conversations with Families

It is important that all families learn about lead poisoning and the risk to young children. However, focusing your attention on families whose children have identified or suspected lead poisoning is a great way to start. To make your conversations with families as effective as possible, use the 3 suggestions listed below:

#1 Focus on school success

Many families are unaware of childhood lead poisoning and its damaging effects to a child's brain development**.** Often, children exposed to lead do not look or act sick. For this reason**,** some families may see this issue as something that doesn't affect them or that isn't a problem. Some families may also view lead poisoning as something that was a problem for past generations but not something they should worry about today.

To overcome cases of family resistance, frame conversations with families around a child's future school success. Let families know that their child may not develop health and learning problems right away, but that their brain development can still be affected. Many children will not show signs of lead poisoning until they reach school age, and by then these problems are irreversible and may lead to problems later in adulthood.

To counteract problems associated with lead poisoning, emphasize that early detection and intervention can help children's outcomes. Advise families to ask their child's doctor for a blood lead test and get their child periodic developmental screenings. If children are in need of early education or developmental services, make a referral and have families enroll their child in needed programs.

#2 Determine the source and get rid of it:

Determining a child's exposure source can be challenging, so start by asking families if their home contains any of the common sources of lead listed in this course using the Possible Lead Sources Fact Sheet. For cases of lead poisoning where a source is unknown or cannot be identified, have families contact their child's doctor or HI-CLPPP for assistance.

Once potential sources have been identified, advise families to get rid of the source by throwing it away, storing it out of their child's reach, or hiring a lead-certified contractor to remove paint and soil.

#3 Make blood lead testing a priority

Most families rely on their child's doctor to inform them about routine blood lead testing. However, relying on doctors to order a blood lead test is not guaranteed to make sure children are tested appropriately. You can help families be advocates for their children by advising families to have their children tested for lead at 1 and 2 years of age. If their child was never previously tested, they should ask their child's doctor for 1 catch-up test between ages 3 to 6.

Families also need to take the additional step of bringing their child to a lab for testing, which can be a challenge for busy families. You can better prepare families for their child's blood lead testing appointment by giving families the following information ahead of time:

- Depending on the facility, they will either take their child to the lab connected to their doctor's office or to an outside lab for the blood lead test.
- Initial blood lead testing will most likely be a capillary (fingerstick) test. It is quick and easy. Make sure their child's hands are washed thoroughly with soap and water before the test.
- If their child's blood lead level comes back elevated they will need to go back in for venous (vein draw) testing to confirm the results. Testing will need to be done every few weeks or months depending on their child's blood lead level. Testing should be continued until the child is lead-free.

Lesson 7: Summary & Resources

Summary

The most important step in preventing childhood lead poisoning is to prevent lead exposure before it occurs. Lead poisoning is caused by inhaling or ingesting lead from the environment. Young children are at the highest risk of lead poisoning because their bodies are rapidly developing and absorb more lead. Behaviors like playing on the ground or putting their hands and other objects in their mouth also puts children at higher risk.

No amount of lead exposure is considered safe for young children. Exposure to lead, even at low levels, can seriously harm a child's health and brain development, causing slowed growth, lower IQ, and problems with learning and behavior. Most children do not look or act sick at the time of lead exposure. Development and behavioral problems may not show up until years later when the damage has become severe and opportunities for early childhood interventions have diminished.

Primary prevention, early detection and early intervention in childhood lead poisoning cases are three ways to positively shape a child's future. Preventing lead exposure from occurring is the best way to keep our keiki safe. When that fails, blood lead testing and developmental screenings are critical in catching lead exposure in its early stages before health, learning, and behavioral problems arise. Once lead exposure has been determined, early intervention should be provided to prevent developmental delays and promote school readiness. Interventions include promoting parent-child interaction and referral to and enrollment in early childhood development and education programs.

Resources

State Resources

- DOH - Hawai'i Childhood Lead Poisoning Prevention Program: Information for families, doctors, and contractors
- DOH - Lead Based Paint Program: A directory of consultants and contractors who are certified by the EPA and the State of Hawai'i to perform lead-related services
- DOH - Hazard Evaluation and Emergency Response Office: Advice on sampling, hiring a contractor, or choosing a laboratory
- DOH - Safe Drinking Water Branch: Advice on water sampling, testing, and information on subsidized lead and copper testing for rainwater catchment systems
- Sharing Our 'Ulu: Resources for Families with Children Under 5
- DHS - Learning to Grow: Ideas for fun ways to help children develop
- The Parent Line: Serves anyone with concerns about parenting and provides a list of statewide community resources

Early Childhood Education Programs

- Low to No-Cost Early Childhood Development and Learning Programs: Executive Office on Early Learning

Lead-Safe Renovation

- Working With Lead Paint Fact Sheet: Information on lead-safe work practices
- Lead Paint Safety Field Guide: U.S. Department of Healthy and Urban Development Office of Lead Hazard Control and Healthy Homes
- Lead Check Swab Instructions: How to use Lead Check Swabs for most accurate results

Take-Home Lead

- Take Home Lead Fact Sheet: How to prevent taking lead home from work or hobby
- OSHA Lead Standards: Information for individuals who work in occupations involving lead