



NATIONAL BLOOD LEAD LEVEL SURVEY

FACTSHEET



**Three out of four children aged 1-6 years old
in Bhutan had blood lead level ≥ 3.5 $\mu\text{g}/\text{dl}$**

2024



National Blood Lead Level Survey

What is Lead?

Lead is an element that has been used in various products for centuries, but it poses significant health risks as it accumulates in the body over time. There is no known safe level of lead exposure. Lead can affect everyone, though children and pregnant women are especially vulnerable. Children, due to their rapid growth, absorb 4-5 times more lead than adults, increasing their risk of developmental issues. Lead poisoning impacts almost all organs, with common effects including lower IQ, learning and behavioral problems, mental health issues, anemia, high blood pressure, stroke, and kidney diseases. Unfortunately, there is no treatment for most cases of lead poisoning. Reducing the risk of lead exposure is critically important.

Effects of Blood Lead Level on Children and Adults

Blood Lead Level in micrograms per deciliter (µg/dL)		Effects on Children & Adults
	Less than 5 µg/dL	<ul style="list-style-type: none"> Decreased IQ, cognitive performance, and academic achievement Increased incidence of behavioral problems and diagnosis of attention deficit/hyperactivity disorder (ADHD) Reduced fetal growth (based on maternal blood lead level) Impaired renal function Contributes to anemia
	Less than 10 µg/dL	<ul style="list-style-type: none"> Delayed puberty Developmental delay High blood pressure Increased cardiovascular-related mortality Spontaneous abortion Preterm birth
	Over 20 µg/dL	<ul style="list-style-type: none"> Anemia
	Over 30 µg/dL	<ul style="list-style-type: none"> Reduced nerve conduction velocity
	Over 40 µg/dL	<ul style="list-style-type: none"> Peripheral neuropathy Neurobehavioral effects Abdominal colic
	Over 50 µg/dL	<ul style="list-style-type: none"> Severe neurological features
	Over 90 µg/dL	<ul style="list-style-type: none"> Encephalopathy
	Over 105 µg/dL	<ul style="list-style-type: none"> Severe neurological features
	Over 150 µg/dL	<ul style="list-style-type: none"> Death

Source: Adapted from the World Health Organization



National Blood Lead Level Survey



What is lead?

Lead is an element that causes health problems in people, especially infants and children.



What health problems does it cause?

Lead goes into a child's brain and stays there permanently. Even small amounts of lead causes lower IQ, learning problems, and behavioral problems. Children are growing very rapidly, so they absorb 4-5 times more lead than adults.



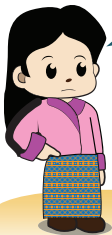
What else does lead do?

Higher amounts of lead in the body can cause developmental delay, anemia, high blood pressure, stroke, kidney disease and other problems.



Is there a level of lead that is safe?

No. No level of lead in the body is safe!



Is there medicine to treat lead in the body?

There is only treatment for very high amounts of lead in the body. There is no treatment for low amounts of lead in the body. You must avoid lead.



How can I do that?

Refer to page 3 for ways you can decrease your exposure to lead.





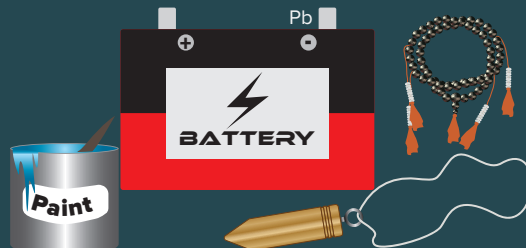
National Blood Lead Level Survey

Ways to Reduce the Risk of Lead Exposure:



Wash Children's Hands Regularly

Lead can be present in dust and dirt. Make sure to wash children's hands with soap and water before they eat and before bed to reduce the risk of ingestion.



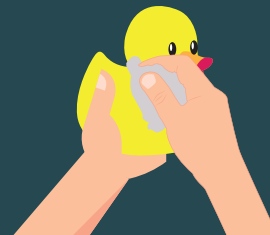
Avoid Known Sources of Lead

Limit children's exposure to areas like vehicle repair shops and metal artisan workshops, and keep them away from items known to contain lead.



Provide a Nutritious Diet

Ensure children have a healthy, nutritious diet rich in iron, calcium, and vitamin C, as these nutrients can help block the absorption of lead in the body.



Keep Toys and Play Areas Clean

Regularly wipe children's toys with a damp cloth and mop the floors where they play to remove any dust or dirt that may contain lead.



Practice Good Hygiene Before Handling Food

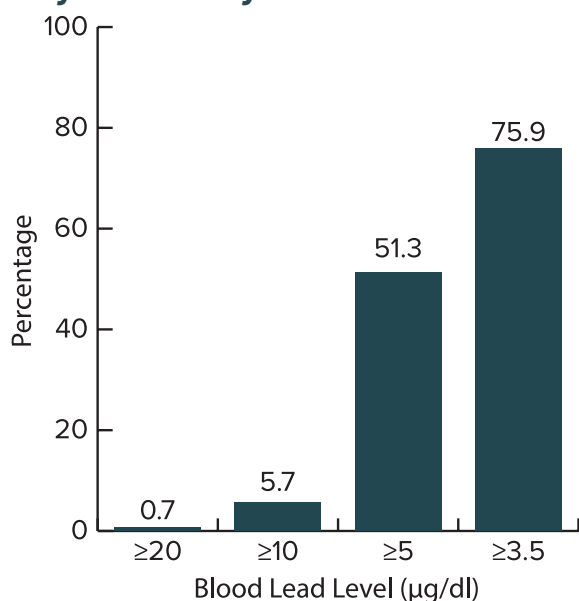
Wash your hands with soap and water before preparing food and eating. Lead has been found in some household and religious items, so regular hand washing helps minimize exposure.



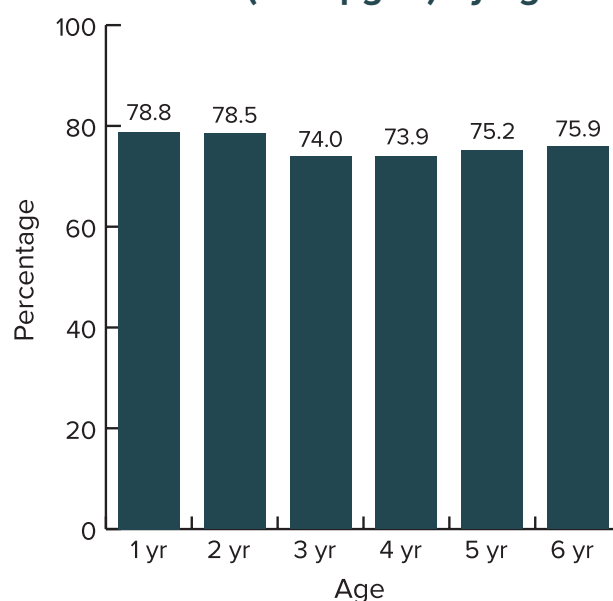
National Blood Lead Level Survey

The National Blood Lead Level Survey 2024 is Bhutan's first nationally representative household survey on blood lead levels in children aged 1-6 (n=2959). It also includes 124 pregnant/breastfeeding women and 207 children under 13 years old from monastic institutions. The survey identifies potential lead exposure sources and examines the impact of blood lead levels on anemia and developmental milestones.

Percentage of children aged 1-6 years old by blood lead level



Percentage of children with blood lead level (≥3.5 µg/dl) by age



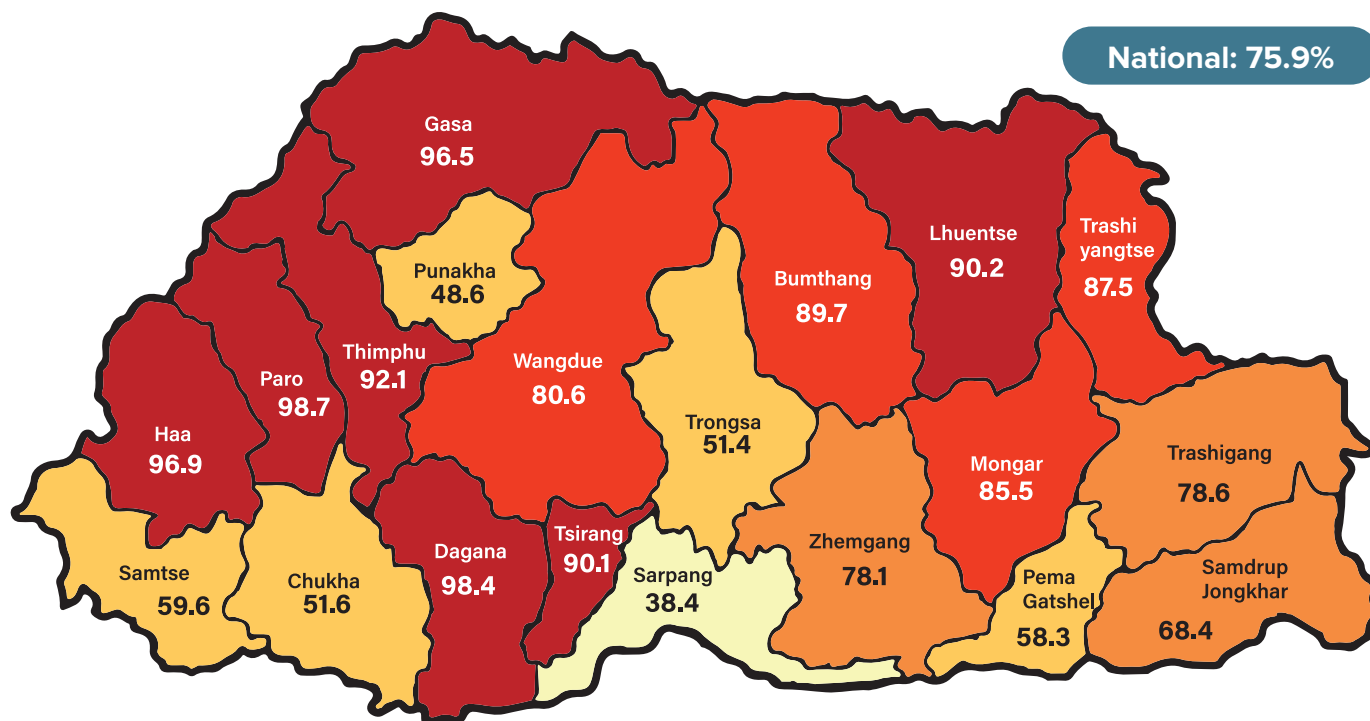
Percentage of children with various blood lead level by background characteristics

Background characteristics	Blood Lead Level (µg/dl)				Number of children
	≥20	≥10	≥5	≥3.5	
Age					
1 year	1.0	8.4	55.2	78.8	411
2 year	0.9	7.8	55.2	78.5	464
3 year	0.6	4.7	50.4	74.0	522
4 year	1.1	6.8	52.1	73.9	465
5 year	0.7	4.2	49.2	75.2	516
6 year	0.0	3.5	47.5	75.9	581
Sex					
Male	0.8	6.4	55.2	79.9	1,544
Female	0.6	5.0	47.1	71.7	1,415
National (Total)	0.7	5.7	51.3	75.9	2,959
≥ Greater than or equal to					

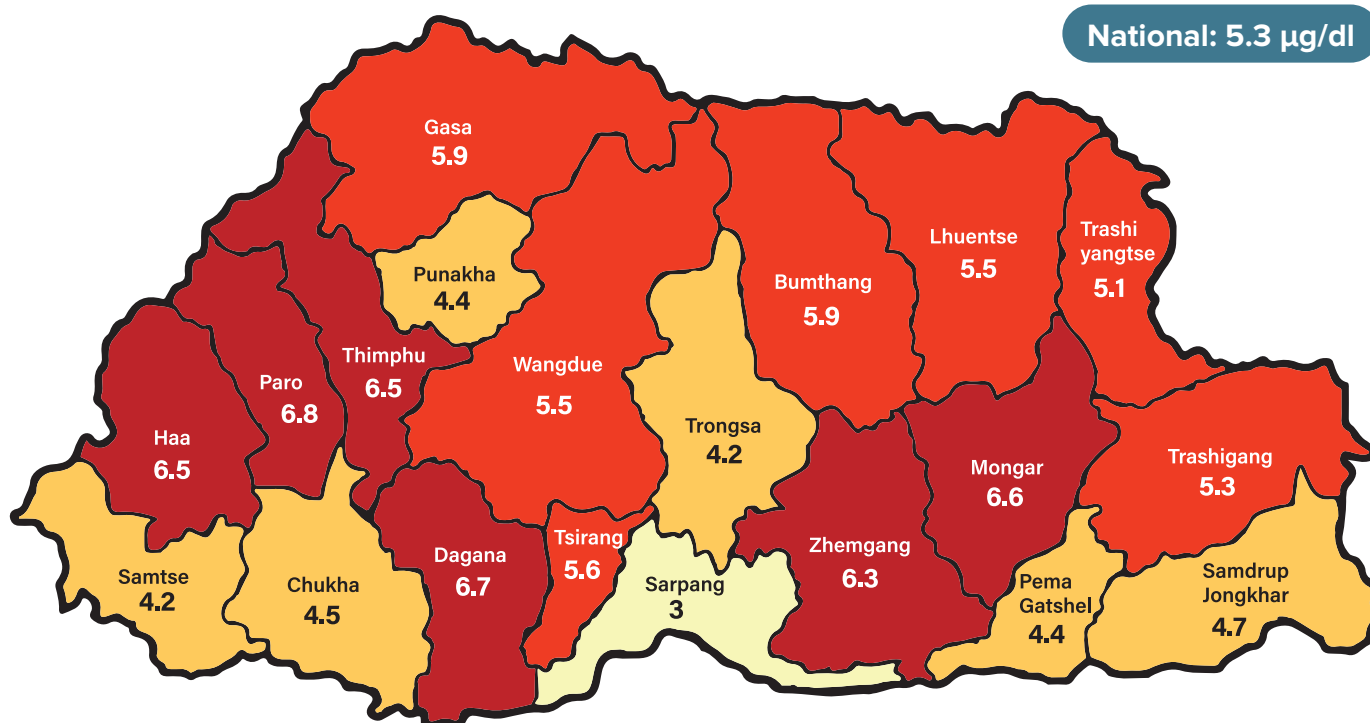


National Blood Lead Level Survey

Percentage of children aged 1-6 years old with a blood lead level $\geq 3.5 \mu\text{g}/\text{dl}$ by dzongkhag

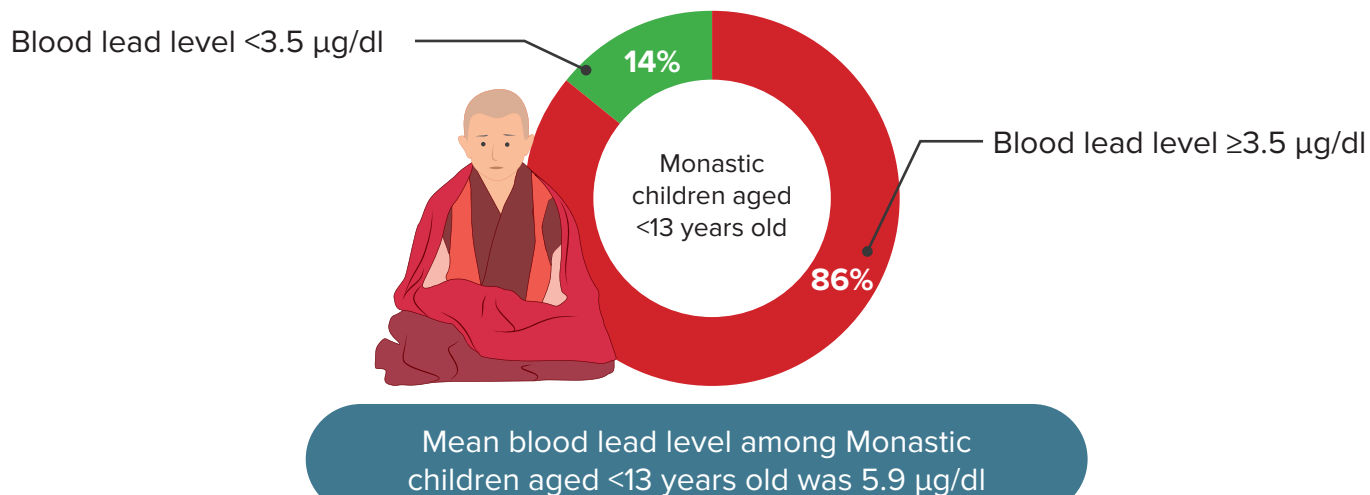


Mean blood lead level of children aged 1-6 years old by dzongkhag

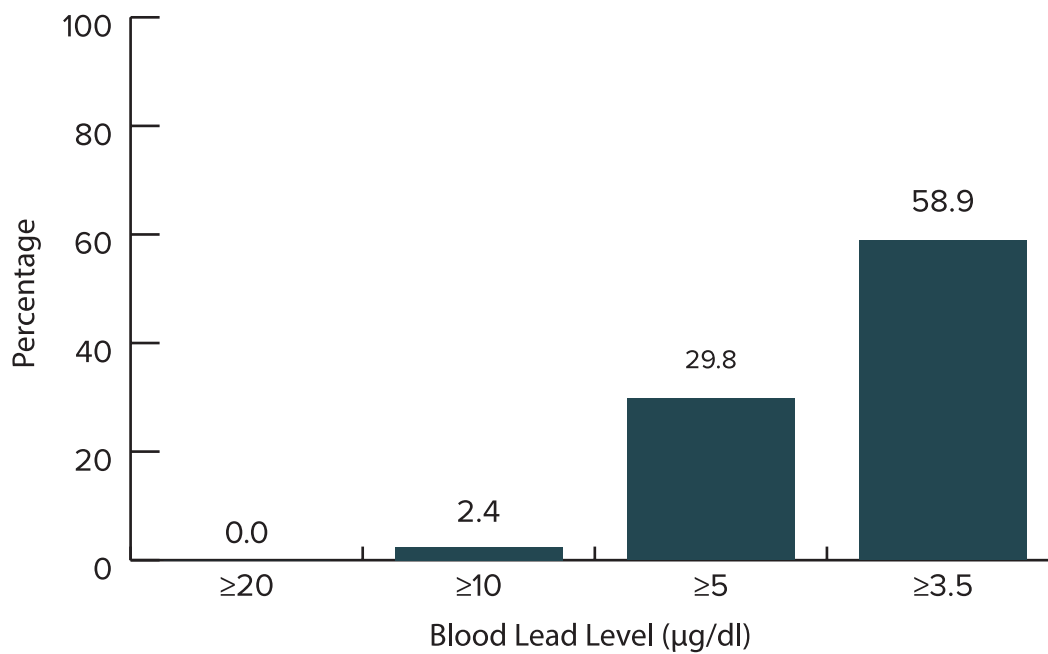




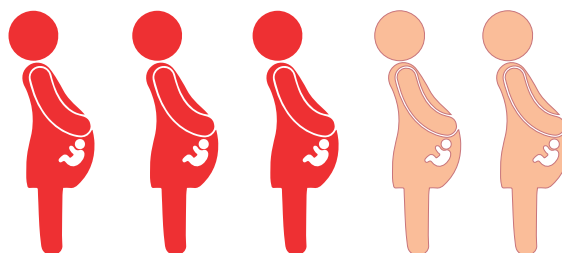
National Blood Lead Level Survey



Percentage of pregnant or breastfeeding women with various blood lead level



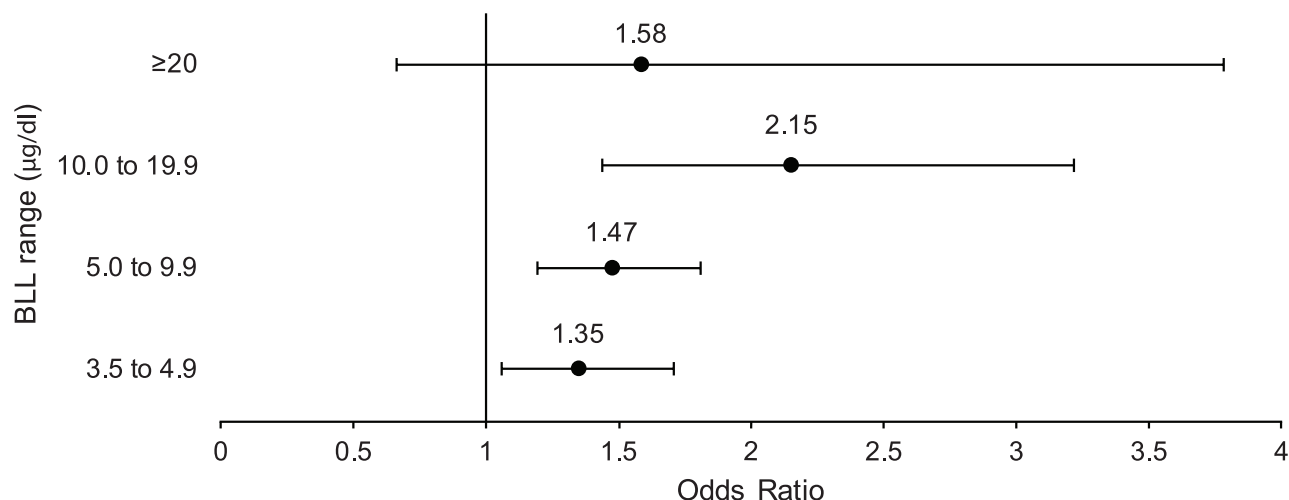
3 out of 5 pregnant or breastfeeding women had BLL $\geq 3.5 \mu\text{g/dl}$





National Blood Lead Level Survey

Association between Blood Lead Level and Anemia among children aged 1-6 years old



Level of lead in the different items tested in and around the households

Items tested	Any lead level (>LOD)	Above reference threshold*	Reference threshold* (ppm)	Total Items Tested
	Percentage of items tested			
Religious items	75.2	NA	NA	214
<i>Jinlab</i>	44.3	44.2	2.5	767
Household Items	47.2	NA	NA	246
Kitchen items	45.1	21.5	100	665
Spices	26.7	20.0	2.5	75
Cosmetics	14.3	14.3	10	14
Toys	23.0	9.1	100	209
School Items (Played or touched by children)	14.6	9.8	100	41
Soil	81.7	3.3	200	60
Paint	29.9	0.8	90	127
Total	44.6	30.0	-	2,418

*Reference thresholds were based on the regulatory standards of the USA and Bangladesh. The threshold for kitchen items was set equivalent to that for toys. While leaching studies were not conducted, these items are used in food preparation and serving. Bhutanese cuisine's acidity, due to ingredients like tomatoes, chillies, cottage cheese, and pickles, likely increases leaching, making the risk of lead exposure from kitchen items comparable to or greater than that from toys.

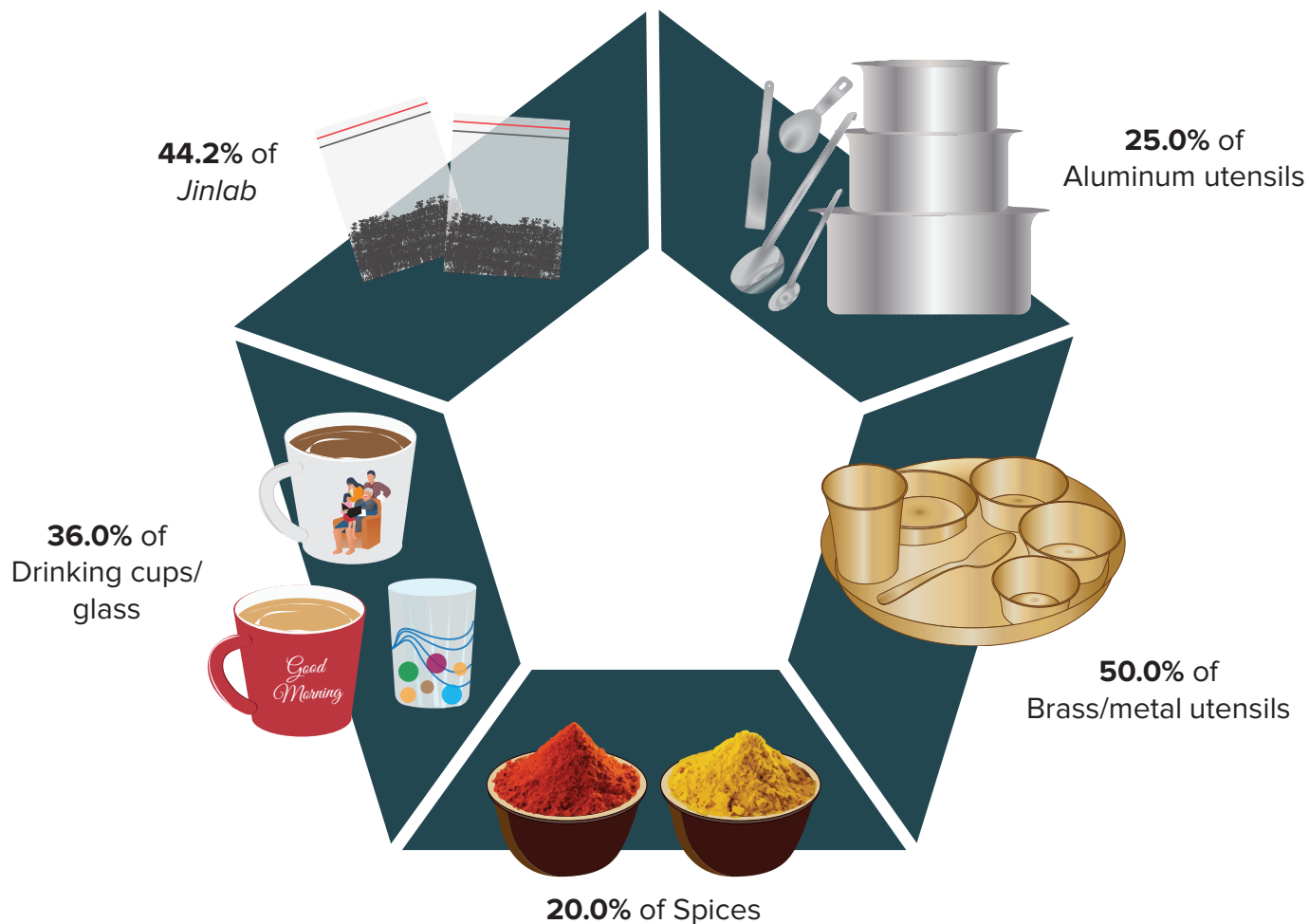
NA: Not Available

LOD: Limit of detection

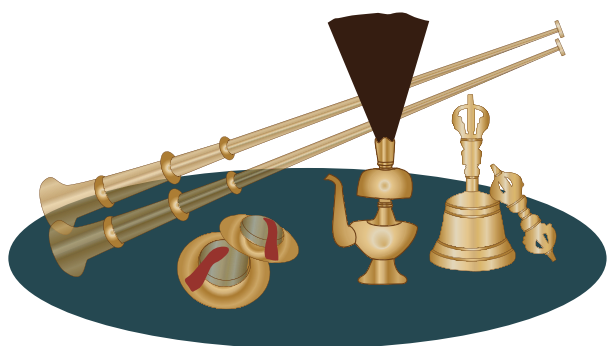


National Blood Lead Level Survey

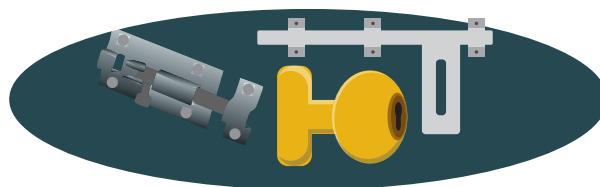
Percentage of tested items containing lead above the reference threshold



Lead was found in other items, such as metal hardware and religious items. Further testing needs to be done to determine the risk of exposure.



75.2% of Religious items



60.7% of Latch/bolt locks/door knobs

Supporting partners



Ministry of Health (MoH), Royal Government of Bhutan
PO Box No. 726, Kawangjangsa, Thimphu Bhutan. 11001

Tel No: +975-2-328095/321842

Email: ppd@health.gov.bt

website: www.health.gov.bt