

Assessment of blood lead levels in chickens, ducks, and other waterfowl/poultry is important from both an animal and human-health perspective..

Where does lead come from?

Lead occurs naturally at very low levels in soil, but some areas have much higher levels due to previous human activity. The highest soil lead levels are usually found in older areas that were previously industrial or urbanized pre-1960's, due to the previous use of leaded gasoline, lead-based paints, and lead pipes/plumbing. Lead has previously been used in a wide number of other items including pottery glazes, insecticides, hair dyes, and cosmetics. Whilst the use of lead in these items was discontinued, it is still widely used in car batteries, pigments, ammunition, weights, cable sheathing, lead crystal glass, radiation protection and some solders.

Chickens, other poultry and waterfowl are often exposed to lead by digging, foraging, and dust-bathing in contaminated soil. They may also ingest small particles or flakes of lead-based paint or pick up small metallic objects from the soil.



What happens if my chicken/duck/goose ingests lead?

Lead is absorbed from the intestine, binds to red blood cells and is then transported to various tissues around the body. Lead can move from blood into bone, where the body stores it in a non-active form. Unfortunately, lead can move back from bone to the blood system when bone calcium is mobilised (e.g. during egg formation), causing levels to rise again.

Lead can be deposited into eggs, which can cause serious human health implications if eaten. It is particularly harmful to children, affecting growth, behaviour, and ability to learn. Lead levels in eggs can be high BEFORE the animal starts to become unwell.

Once a certain level of lead is reached, birds start to show signs of lead toxicity, which may include:

- o Generalised lethargy or loss of appetite
- o Gastrointestinal problems (e.g., crop stasis, diarrhoea)
- o Reproductive problems (e.g., shell-less eggs)
- o Neurological problems (e.g., weakness, inability to stand, tremors, seizures)

What to do with your results

It is important to recognize that this test is ONLY assessing blood lead levels. There are other heavy metals and chemicals that can also cause toxicity. Your vet will discuss these with you, as necessary.

Category 1. Blood lead levels under 20 µg/dL are unlikely to cause illness in birds or high levels in eggs. **Category 2. Blood lead levels between 20 µg/dL and 50 µg/dL** indicate significant exposure, and are likely to result in unacceptable lead levels in eggs. Birds in this category may or may not appear unwell.

Category 3. Blood lead levels above 50 µg/dL are consistent with lead toxicity and these birds will almost always be unwell

If your bird's results fall into category 2 or 3:

- o Immediately stop consuming eggs from any chickens or other poultry/waterfowl at home
- o Consult your GP for advice on the risk of exposure to lead from eating these eggs and from contact with soil through gardening or home-grown produce
- o Reduce further exposure of the birds to lead (see further information below)
 - This includes having your soil tested for lead (see Soil Testing, below)
- o Chelation therapy to reduce lead levels in the body may be indicated – our vet will discuss this with you, if required
- o Further diagnostic options that may be recommended include blood tests to look at the health of blood cells as well as organ function, and radiographs to look for large metal objects within the gut

Blood Lead Levels	Bird	Eggs	Recommendations
Less than 20 µg/dL	These results are unlikely to be associated with illness	Unlikely to be associated with high lead levels in eggs	If the patient is otherwise well - no further action required.
20 – 50 µg/dL	Birds in this category may or may not appear unwell	Likely to be associated with higher lead levels in eggs	<ul style="list-style-type: none"> - Immediately stop consuming eggs - Consult your GP - Reduce further exposure to lead (see below)
More than 50 µg/dL	Consistent with lead toxicity and birds will almost always show clinical signs	Extremely likely to be associated with high lead levels in eggs	<ul style="list-style-type: none"> - Chelation therapy or further diagnostics may be recommended by our vets

Chelation treatment

Chelation binds lead circulating in the blood so that it can be removed from the body via the kidneys. This process can only remove lead in the bloodstream and does not reduce lead stored in bone.

If your pet is clinically unwell, chelation is started in hospital with injectable medications alongside fluid therapy to support the kidneys in removing the toxins from the blood. This is often followed by oral chelation therapy at home.

If your pet is not unwell, your bird is likely to start on oral chelation therapy at home.

Repeat blood lead testing

It is important to repeat the blood lead levels at the end of treatment to ensure chelation has reduced the blood lead to safe levels. Blood levels of lead should be repeated again after chelation has stopped, to check that blood lead levels have not risen, as this could indicate that there is lead stored in the bones (which will require longer treatment).

Testing lead levels in soil

Soil testing is offered by VegeSafe – a program run by the Macquarie University in Newcastle. You can find further information at www.360dustanalysis.com/get-started/soil. Recent research by the University has found that soil lead levels need to be less than 117mg/kg in order to keep egg lead contents below the recommended food safety benchmark.

Reducing lead exposure

- Avoid scatter feeding on ground and use elevated feed containers
- Clean food off the ground regularly
- Remove topsoil, then add clean soil on top
- If you've had soil testing done, reduce access to specific areas of the property that contain higher levels of lead
- Keep chickens away from buildings or other structures that may have lead-based paint

Reducing human exposure to lead in chicken eggs

- We recommend consulting your GP regarding the lead content in chicken eggs and risks of exposure
 - Lead may accumulate more in egg yolks than egg whites
 - Remove dust and soil from eggshells before preparing eggs for consumption
- **do not wash eggs as this can increase the risk of salmonella****

Additional Resources

Lead poisoning of backyard chickens: Implications for urban gardening and food production

<https://www.sciencedirect.com/science/article/abs/pii/S0269749122010120?via%3Dihub>

Lead poisoning of backyard chickens by Mark Patrick Taylor

<https://www.youtube.com/watch?v=aehBQA0IH2M&t=127s>