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7. Lead ammunition

The use of lead as ammunition is an important, and topical, issue. There are many reasons for the historical and continued use of lead ammunition, as well as an important body of evidence looking at its impacts on human health, the environment and wildlife. The debate continues, and each individual will face a choice regarding their ammunition usage.

Developing alternatives is important for the ammunition industry, however there is still little information regarding the properties and potential effects of these.

Why do we use lead for ammunition?

Since the invention of firearms, lead has been used for bullets and shotgun pellets. Guns and rifles were designed with this ammunition in mind. Lead has properties that give the projectiles good range, penetration and lethality.

Is lead toxic to humans?

Yes. Along with some other common metals such as copper[144], aluminium and silver, lead is toxic[145]. There is no agreed safe level of lead[145].

What has been done to reduce exposure?

Increased knowledge about lead toxicity prompted the removal of lead from paint and petrol. This has reduced our lead exposure and blood lead levels are ten times lower than they were 30 years ago[146]. The main source of lead exposure now is from food[147].

Why is there lead in food?

Lead in found in soil, in very different amounts in different areas. This lead comes both from natural sources, for example the underlying bedrock, and from many different human sources such as industry and coal burning power stations contributing to lead in the atmosphere, which is then deposited in surface soils[146].

This can be taken up into plants destined to be food, or deposited onto them from the atmosphere. In general, the level of lead in the environment and our food is very low, and dropping in recent decades since the removal of some lead sources, but it does vary[147].

Which foods do we get the most lead from?

In the average diet, we ingest most of our lead through bread, tap water, beer, tea and potatoes. Although these foods contain very low levels of lead from background sources, they are consumed in relatively large quantities[147].

Who advises the government on food safety?

Human health toxicologists at the Food Standards Agency (FSA) and the European Food Safety Authority (EFSA). They both reported on lead in 2012[147,148].

What does the FSA think about eating lead-shot game?

FSA advice is that "frequent consumers of lead-shot game should eat less of this type of meat"[149], but has not given advice on the number of portions of lead-shot game that should be eaten because levels of lead in game are very variable.

Is this the same for everyone?

This advice is especially important for vulnerable groups such as toddlers and children, pregnant women, and women trying for a baby, as exposure to lead can harm the developing brain and nervous system[149].

Can I reduce my exposure by removing lead from the meat?

Careful butchering to remove lead shot and tissue from around the wound channel can help reduce, but does not eliminate lead exposure[150].

Can lead be dangerous to wildlife?

Yes. When waterfowl ingest spent shot mistaken for grit or foodstuffs it can result in lead poisoning. In addition, birds which are shot but not killed may carry lead shot in their muscles[151].

Is this why lead ammunition was banned over wetlands across Europe?

Yes. Legislation restricting the use of lead was introduced in England in 1999, Wales in 2002 and Scotland in 2004.

Has this legislation reduced wildlife deaths through lead poisoning?

We don't know. There have been no new studies of wildfowl lead ingestion since legislation was introduced. One estimate suggests that 73,000 wildfowl die each year in the UK, however this is still based on lead ingestion rates prior to the introduction of regulations banning lead ammunition for waterfowl[152].

Is there any evidence that lead is having a population-level impact on wildfowl?

Whilst there are negative impacts on individual birds exposed to lead, studies have not shown a direct effect of lead shot exposure on wild bird populations in the UK. There is evidence that exposure to lead shot may have a negative effect on mallard populations in France[151], and that lead from fishing weights affected mute swan populations in the UK[154]. These two sources of exposure have been removed for waterfowl by the wetlands lead shot restrictions, and the ban on lead fishing weights.

Lead ammunition: the law

The regulations regarding lead shot are not the same across the UK. In England and Wales, they are based on species as well as habitat, but in Scotland and Northern Ireland, lead use restrictions are only based on habitat.

In England and Wales the use of lead shot is prohibited as follows:

1. On or over any area below the high water mark.
2. On or over certain Sites of Special Scientific Interest. In addition, it is an offence to stand in a designated area and shoot a bird outside it with lead shot or to stand outside a designated area and fire lead shot over it.
3. For the shooting of ducks and geese of any species, coots or moorhens[153].

In Scotland and Northern Ireland, the use of lead shot is prohibited for shooting anything on or over all wetland areas. Wetland is defined under the Ramsar Convention, as areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh brackish or salt; including area of marine water the depth of which at low tide does not exceed six metres. However, ducks and geese can be shot with lead over non-wetland areas in Scotland.

It is imperative that all who participate in shooting adhere to the legislation regarding the use of lead ammunition. Failure to do so not only risks the deposition of lead into sensitive habitats, but leaves both the individual and the shoot open to prosecution.

Is lead shot exposure is having an impact on gamebirds?

There is evidence that gamebirds can ingest shot into the gizzard when taking in grit, however this is seen at a lower level than in waterfowl. A GWCT study published in 2005 found that 4.5% of found dead birds contained shot in their gizzard, and estimated that 1.2% of living wild grey partridge contain ingested shot at any one time[155]. Other studies report similar findings in pheasants and red legged partridge, but do not record negative impacts on bird health[156,157]. One study in Canada demonstrated elevated lead levels in the liver of pheasants and some partridge species, without analysing the health consequences for those birds[158]. There is not enough evidence to know if lead shot exposure is having an effect.

What happens to lead shot in the muscles of birds?

Lead shot carried in living birds can gradually leach into the animal, and raise their exposure[156]. This may have impacts on the health and behaviour of the birds themselves, and some evidence suggests that birds exposed to sub-lethal levels of lead may be more susceptible to predation and other causes of death[159].

This also highlights another issue – if these birds are then predated, or die and are scavenged, the raised level of lead in their bodies and possible small fragments of lead shot may be consumed by predators or scavengers and pass up the food chain. Some studies find that birds of prey which eat gamebirds may have increased lead levels, and possibly lead poisoning, via this route[160]. A study on marsh harriers showed that they have higher blood lead levels, and more harrier pellets contain lead shot, during the hunting season than outside of it. It is thought that spent lead shot carried in the carcasses of prey is the source of this raised lead exposure[161].

Is there evidence of non-compliance with existing lead ammunition legislation?

Yes. Informal purchases of duck from game dealers in England show that up to 70% are still being shot illegally with lead[162], although the source of the duck was not known.

What non-lead ammunition is available?

Alternatives to lead ammunition are continually being developed using other metals including steel, copper, tungsten or bismuth.

Shot commonly referred to as "steel" is in fact manufactured from soft iron.

Do we know the environmental impacts of all these alternative ammunitions?

No. More research is needed. There is emerging evidence, for example, that tungsten may be carcinogenic[163,164], and possibly damaging to soil bacteria and earthworms at higher concentrations[165]. The impact of bismuth exposure is also an area which needs more investigation[166]. A thorough assessment of the alternatives is essential.

Are there other considerations around changing?

Because the ballistic properties of alternative ammunitions are different to lead, important parameters such as killing range will also differ. For example, the most common alternative, steel, is less dense and therefore does not carry as much energy as far as lead shot of the same size – meaning that there is more potential to wound rather than kill, if the reduced kill range is not remembered. When changing ammunition, remember that your shot size and shooting style may need to change.

Did you know?

Informal purchases of duck from game dealers suggest that up to 70% are still being shot illegally with lead.

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Follow the Code

Lead ammunition

*"Shoot managers **must** ensure Guns comply with the relevant regulations restricting the use of lead shot"*

"Guns must ensure they know and recognise the intended quarry species and comply with the relevant lead shot regulations"

*"Guns **should** avoid depositing lead shot in wetlands important to feeding waterfowl"*

The Lead Ammunition Group

Defra formed the Lead Ammunition Group in 2010 to review the science alongside other issues that needed to be taken into account, and make any recommendations both in relation to human health and wildlife. The terms of the group stated that a consensus should be reached by the group in the final report.

The group was chaired by John Swift (BASC Chief Executive until 2013) and included representatives from GWCT, the RSPB, Wildfowl & Wetlands Trust, Countryside Alliance, Gun Trade Association and the Game Dealers Association, as well as other professionals. On the government side, the Food Standards Agency and Defra were present.

The LAG spent many years researching this issue, and produced a comprehensive report in 2015. However, there was not agreement across the whole group as to the appropriate steps to be taken and some group members resigned.

The report and its supporting documents are available to read at: **www.leadammunitiongroup.org.uk/reports**

Ask the shoot

In England and Wales

1. Will there be a duck drive or evening flight?
2. Will there be a mixed game and duck drive?
3. If there is a SSSI – is it one where the use of lead shot on or over it is banned?
4. How do you ensure that the shoot and all Guns comply with the lead shot legislation?*
5. What do you do, in addition, to ensure no lead is dropped on wetlands?

In Scotland

6. Will we be shooting on or over any wetland?
7. How does the shoot ensure that Guns comply with the law on lead shot?

*It is important to make clear to the shoot that you will be keeping to the law and advise fellow Guns to do the same, if the shoot implies that using lead shot unlawfully does not matter.