Innspill til ECHA fra Norges Jeger- og Fiskerforbund – desember 2019

Call for evidence on possible restriction of lead in shot, bullets and fishing tackle

The focus of ECHA’s investigation is on the risks posed by lead to the environment and wildlife as well as risks to humans through consumption of game meat. The Agency is specifically looking for information on:

* the quantities of lead used or released to the environment and the resulting human health or environmental impacts;
* current best practice to minimise lead exposure to humans or the environment during use;
* alternatives to lead shot, bullets and lead in fishing tackle; and
* other socio-economic impacts on society with regard to a possible restriction, such as costs and/or benefits to any affected stakeholders.

The information received through the call for evidence will help the Agency prepare its restriction proposal.

**Background**  
[The European Commission has requested](https://echa.europa.eu/documents/10162/13641/rest_lead_ammunition_COM_request_en.pdf/f607c957-807a-3b7c-07ae-01151001d939) ECHA to develop an Annex XV dossier for a possible restriction on the placing on the market and use of lead in ammunition in terrestrial environments, bullets in any terrain and in fishing tackle. The proposal aims to address concerns posed by lead gunshot, bullets and fishing tackle to the environment, reduce the mortality of an estimated one to two million birds, and reduce health risks to a significant population of hunters and their families who frequently eat game meat killed with lead shot or bullets.

ECHA has earlier proposed a restriction on the use of lead shots over wetlands. This proposal is currently with the Commission for decision making.

[**https://echa.europa.eu/-/call-for-evidence-on-possible-restriction-of-lead-in-shot-bullets-and-fishing-tackle**](https://echa.europa.eu/-/call-for-evidence-on-possible-restriction-of-lead-in-shot-bullets-and-fishing-tackle)

**General information:**

**The Norwegian Association of Hunters and Anglers (NJFF)**

The only nationwide interest organisation for hunters and anglers in Norway.

Key numbers:  
113 000 members  
573 member clubs

NJFF works continually to:

* secure and maintain viable game and fish stocks in order to ensure future hunting and fishing opportunities
* ensure that all motivated hunters and anglers can gain access at a reasonable price
* promote hunting and fishing as legitimate forms of harvesting natural resources now and in the future​
* educate new hunters (approx. 10 000+ new hunters educated each year)
* be the leading provider of knowledge about hunting firearms and ammunition

Norwegian gun culture is largely characterized by the country's large number of hunters. From the beginning of the 1970s until 2018, the number of hunters who solve the hunting fee has doubled, and every year around 10-14,000 people take the hunter test. In 2019, 510,000 hunters were registered in the hunter register, and of these, 204,800 paid hunter fees for the hunting season 2018/2019. The proportion of female hunters has also increased, and now amounts to approx. 15 percent of registered hunters. Among the new hunters who take the hunter test, the proportion of women is 30 per cent.

The number of firearms owners in Norway are approximately 500 000, owning a total of 1.4 million registered firearms. Until 1990 shotguns were not registered, and there are approx. 2 – 500 000 legal non-registered shotguns in the country. Airguns are not subject to license/authorization, and the number og airguns are not known.

In Norway lead is generally banned in shotgun ammunition. There has been a lead ban on the shooting ranges since 2002, and for hunting lead is banned except when hunting terrestrial species. (The “revoke” of the total lead ban on shot in Norway, was in fact just an exception that allow use of lead shot on terrestrial species, due to the lack of evidence that lead shot posing any environmental problems when used on hunting in forests and in the mountains.) In clay shooting there are some very limited derogations that allow active competition shooters to use lead shot in Olympic disciplines, and in some disciplines where steel shot cannot be used because of ricochet danger.

**Question 1**: The scope of our investigation can be further elaborated to cover the following elements:

1. Lead used in gunshot for hunting birds and other animals (e.g. rabbits) in terrestrial areas (i.e. outside of wetlands),
2. Lead used in gunshot for ‘sports’ shooting, including training i.e. clay pigeons,
3. Lead used in bullets/pellets for hunting any animal (e.g. deer),
4. Lead used in bullets/pellets for ‘sports’ shooting, including training (indoor and outdoor) i.e. targets,
5. Lead used in fishing tackle (weights, lures, jigs) for recreational fishing,
6. Lead used in commercial fishing gear.

Please note that, in line with the terms of the Commission request, military uses are outside of the scope of the Commission’s request.

We will investigate the risks posed by lead to the environment as well as to humans via the environment (i.e. through the consumption of food).

The objective of this call is to gather information on the following topics for each of the uses A to F above:

Information on quantities of lead used and/or released to the environment and the resulting human health or environmental impacts. We are especially interested in information on:

1. The quantity of lead present in products placed on the EU market and the potential for release to the environment during use;

Every year approx. 100 000 big game hunters harvest a total of a little more than 100 000 big game (moose, red deer, reindeer and roe deer). The number of small game hunters are also around 100 000 harvested small game, is approx. 350 000 per year.   
Most (300 000) of the harvested small game is terrestrial species, like grouse, capercaillie, black grouse, pigeons, hare and fox. Only approx. 50 000 waterfowl/waterbirds are harvested pr. year.  
Source: Statistics Norway [www.ssb.no](http://www.ssb.no)

The import on shotgun ammunition to Norway equals approx. 20 mill. cartridges per year (average 2015-2018). The percentage of non-lead shotgun ammunition is 92%, and lead ammunition is 8%. Based on the hunting statistics, only 5% of the ammunition is used for hunting, and 95% is used for sport shooting/training at shooting ranges.  
Numbers based on official import statistics, source: Statistics Norway [www.ssb.no](http://www.ssb.no)

For big game hunting with rifle there is compulsory training and a shooting test that all big game hunters must pass every year. Minimum 30 rounds training and a 5-round test. That equals 3.5mill rounds compulsory shooting at the range. With an estimated approx. 1.5 rounds per harvested big game, that equals 150 000 rounds used when hunting big game. In summary the big game hunters are shooting 95% at the range and 5% when hunting.

Competition shooting with rifle is a very large activity in Norway, with tens of thousands active competition shooters. The total percentage of rifle rounds fired at shooting ranges might be as high as 98-99%.

1. Information on the frequency and extent of lead poisoning observed in terrestrial species of birds, including predatory and scavenging species;

The frequency and extent of lead poisoning in terrestrial species of birds is very low. In the years 1995 -2003 all protected species found dead were examined by the Norwegian veterinary institute to establish cause of death\*. Regarding the terrestrial species, the frequency of lead poisoning being the cause of death, was virtually zero. Predatory and scavenging birds was a large part of the investigated birds. The only examples of lead poisoning were related to swans (at the most 3 birds in one year, but most years 0 or 1 bird), and equalled 0 – 0,4 percent of the total numbers of birds examined. The last decades lead poisoning of swans has not been an issue (lead ban when hunting waterbirds since 1993)   
\* <https://www.vetinst.no/dyr/vilt/fallviltbehandling-freda-arter>

Today there is a general ban on the use of lead shot (both hunting and sport shooting) in Norway, with an exception for hunting terrestrial species. This risk of terrestrial (and wetland) species being poisoned by lead shot is extremely low with today’s regulation, and no further restriction is required.

We are not aware of documented problems with poisoning of raptors and scavenging birds, related to discarded gut piles from big game and similar. To be on the safe side hunters are advised not to leave heart and lungs in the forest when animals are shot with lead bullets.

1. Statistical information on the annual game meat consumption in a country or regional area? (Approximation of the weekly/yearly consumption in grams and/or the frequency of meals can be provided as well as the specific species consumed, if possible.);

The mean intake of game meals is calculated to be 5 – 7 meals of game meat per year. (VKM Report 2013: 27, by the Norwegian Scientific Committee for Food Safety) <https://vkm.no/download/18.1b70ef9115d3ac37645e3fa4/1501682717201/cbfe3b0544.pdf>

1. The consumption of game meat in specific groups such as infants, small children, women in childbearing age or high consumers (such as hunters and their families);

Men reports to eat game meat more frequently than woman. It is expected that children eat game meat as frequently as the rest of the family. (The mean intake of game meals is calculated to be 5 – 7 meals of game meat per year.) Source: VKM Report 2013: 27, by the Norwegian Scientific Committee for Food Safety

1. Any differences between on- and off-hunting season consumption; is the game frequently e.g. frozen or otherwise preserved for later use;

There are limited available data, but probably no big differences between on- and off-hunting season consumption. Game meat is frequently frozen and preserved.

1. Information on the absorption rate of lead to human body from ingested gunshot and/or bullets or from some other analogous material;

There are very limited data regarding absorption rate of ingested lead shot/lead fragments. In low- or average consumers of game meat, it is (according to Norwegian studies) not possible to measure any difference to non-consumers of game meat. In general, for the average game meat eater, other factors than game meat seems to have a greater impact on blood lead levels (age, sex, smoking, wine drinking etc.) In order to avoid the risk of lead absorption, and reduce the risk of elevated levels of lead in blood also for high consumers, “best practice game meat handling techniques” are established by the Norwegian Food Safety authorities, based on the assessment done by the Norwegian Scientific Committee for Food Safety (VKM Report 2013:27) The Scientific committee also concludes that “more data are needed to assess bioavailability of metallic lead in food.”

1. Information on the blood lead levels of game meat consumers and hunters;

There are several Norwegian studies regarding blood lead levels of game meat consumers and hunters. Data is summarized in the risk assessment done by the Norwegian Scientific Committee for Food Safety (VKM Report 2013: 27, by the Norwegian Scientific Committee for Food Safety)  
<https://vkm.no/download/18.1b70ef9115d3ac37645e3fa4/1501682717201/cbfe3b0544.pdf>

1. Any other relevant human health/exposure data related to lead containing gunshot and bullet or fishing tackle, or the alternatives of these articles?

Data related to exposure of non-lead ammunition is very limited. Still the Norwegian army has tried to implement non-leaded ammunition, but not without problems.   
Soon after the use of non-lead ammunition started, soldiers began to get symptoms of metal fever when using non-lead ammunition. That lead to an investigation of the ammunition used, to establish the amount of metal fumes in the non-lead ammunition, and the factors causing it. (e.g. bore diameter is a central factor regarding the amount of abrasion from steel core ammunition. Civilian arms will most likely have a wider variation in the tolerances than standardized military arms, and the effect of this kind of ammunition in civilian arms is somewhat uncertain).

From the summary of the Norwegian investigation of “Emission of gas and dust from small arms” by the Norwegian Defence Research Establishment (FFI); Source: FFI-rapport 2015/01728

*“The background for this investigation is the health-related problems experienced by some units of the Norwegian Armed Forces after the introduction of so-called “non-leaded” ammunition for small arms. These problems were relatively rare, but still they created a major problem for those persons and the units involved.*

*The health problems correspond to symptoms typical for metal fever. The symptoms experienced were nausea, sore throat, joint pains, headache, flu symptoms, dizziness, chills, light fever, laxity, etc. The user of the weapon would typically experience the problems a few hours after finishing the firing. The symptoms lasted for some hours but would then cease without leaving any long term effects. Usually the user was quite fit on the morning after the firing.*

*Metal fever would indicate that the reason for the problems is the metallic content in the dust that is emitted from the weapon. However, it could not be excluded that some gases in the propellant combustion products could contribute to the problems. Thus, both metals and a few poisonous gases were subject to analyses.”*<https://publications.ffi.no/nb/item/asset/dspace:2531/15-01728.pdf>

1. Information on the practice of ‘home casting’ of fishing tackle with lead and/or the re-filling of cartridges;

We have no specific data on the amount/frequency of “home casting” fishing tackle with lead, but we assume that it is not very common. Home casting of bullets is a very rare activity for hunters, but more common among competition shooters (mostly for use in handguns).   
Reloading of ammunition is quite common among both hunters and sport shooters. Reloading of rifle-ammunition is normally done with jacketed (sport shooting) or semi jacketed (hunting) bullets, and the lead exposure from reloading activities should be limited. When reloading ammunition with bullets that have exposed lead, it is advised to take hygiene precautions (wash hands frequently, use single-use gloves etc.)

**Question 2**: Current best practice (including effectiveness) to minimise lead exposure to humans or the environment during use, for example (please elaborate):

1. best available techniques to remove lead from edible portions of meat prior to consumption;

The hunters in Norway are following the “best practice” as advised by the authorities. This is a focus area in The Norwegian Association of Hunters and Anglers (NJFF) and is also a part of the education prior to the compulsory hunting exam for new hunters. In order to place big game meat on the market, the animals must be inspected by a person authorized to approve that “best practice” is followed. Game will be marked with a tag stating the type of ammunition used (lead or non-lead ammunition).

The Norwegian Food Safety Authority's advice on wild meat shot with lead ammunition:  
*«Do not eat the meat around the wound channel from large game that is shot with lead ammunition. Any visible damaged tissue and a minimum of ten centimetres in radius around the wound channel should be cut away and discarded.*

*Meat far away from the canal (for example, roast, fillet, throat, thigh and leg) does not contain harmful amounts of lead and can be safely eaten.*

*Do not eat small game shot with lead shot more often than once a month. Lead shot and visible damaged tissue should be removed anyway.*

*Women planning to become pregnant, pregnant, breastfeeding and children under seven years should not eat wild meat that may contain lead because fetuses and children are more sensitive to lead than adults. »*

*Source:* [*https://www.matportalen.no/matvaregrupper/tema/fjorfe\_og\_kjott/begrens\_inntaket\_av\_viltkjott\_med\_blyrester-1*](https://www.matportalen.no/matvaregrupper/tema/fjorfe_og_kjott/begrens_inntaket_av_viltkjott_med_blyrester-1)

The Norwegian practice is the same as advised in several other countries, and by the European hunters organization FACE; <https://www.leadammunitionguidance.com/lead-ammunition-in-game-meat/>

1. best available techniques to manage lead exposure on indoor and outdoor shooting grounds (including national or European standards or recommendations to capture lead and/or minimise environmental exposure to lead);

At rifle and pistol ranges there are bullet traps/backstops that catches the bullets. At outdoor ranges the bullet trap material will normally be sand. It is required to use fine grained material that will not cause unnecessary splintering of the projectiles. The use of bullet traps ensures that the lead from projectiles is contained in a controlled environment, and tests show that lead in the runoff water in most cases is limited to the proximity to the bullet traps. Lead in runoff is in most cases negligible outside the shooting range area.\* There are established recommendations on how bullet traps/backstops should be constructed in order to contain lead with minimum runoff.   
\*NIVA 5870 – 2009 Avrenning av metaller fra tre geværskytebaner   
<https://niva.brage.unit.no/niva-xmlui/handle/11250/214715>

When new shooting ranges are established, a risk assessment regarding all kinds of pollution of the environment is compulsory. Risk management, both regarding safety issues and in order to avoid leakage of lead from backstops, is an important part of the construction of shooting ranges.  
Safety regulations: <https://www.dfs.no/globalassets/documents/skytterkontoret/avdelinger/anlegg/dokumenter/forkrifter_anlegg_1988.pdf>   
In order to ensure that all new shooting ranges take all necessary precautions related to both safety and environment when established, an official manual has been developed: <https://www.regjeringen.no/contentassets/13d7e0015cc043a78abd8c6124cd00b2/192580-skytebaner-aug2019.pdf>

The use, and development of bullet traps to collect (and enable recycling of) bullets is also an important part of the risk management concerning lead projectiles.

Due to the strict regulation and the measures taken to ensure that the lead deposited on shooting ranges does not pose hazard to the environment outside the ranges, the risks related to lead is adequately managed.

1. Use of inert materials to encapsulate lead in fishing tackle.

**Question 3**: Alternatives

1. The volumes (tonnages) of lead shot, bullets and pellets as well as fishing weights of products placed on the EU market;

The importation of shotgun cartridges to Norway (2015-2018) is on average 61 tons of lead cartridges and 720 tons of non-lead cartridges a year. Source; Statistics Norway [www.ssb.no](http://www.ssb.no) Taking into account that approximately 70% of the cartridge weight is shot, that should equal 43 tons of lead shot, and 504 tons of non-lead shot.

We have no exact data on the amount of bullets and fishing weights. The largest rifle-shooting organization in Norway, Det Frivillige Skyttervesen (DFS), estimates an amount of about 40 tons of lead as a yearly consumption. DFS owns at least 80% of the rifle-ranges in Norway.

1. the identity of existing or emerging alternatives and any information on the existing market share of comparable products on the market that do not contain lead;

In addition to steel, bismuth and tungsten are amongst the alternative shot materials available. These alternatives are remarkably more expensive than both lead- and steel shot. The market share of these alternatives is quite low, due to both price and other characteristics. Eg. most tungsten alloys are harder than steel and can only be used in the most modern shotguns. Bismuth is functional for some purposes, but larger shot sizes tend to splinter on impact. None of these alternatives are suitable for sport shooting.

Most rifle shooting is done with jacketed lead bullets. In civilian use there are some copper based alternatives available for big game hunting. The availability of non-lead rifle ammunition is limited, and in some calibres, there are very few non-lead alternatives. Due to requirements regarding minimum impact energy for ammunition used for hunting big-game, non-lead bullets are not an alternative in some of the most common calibres in Norway, as the non-lead ammunition is not able to reach the minimum requirements. (primarily the use of calibre 6,5mm).

The use of non-lead competition rifle ammunition is negligible. Precision shooting requires the use of ammunition that the firearms are intended to use. So far, the quality and precision of non-lead projectiles is not up to the required standard, and most firearms are not intended/built to use such ammunition (eg. not suitable twist rate in the rifle-barrels for use with non-lead projectiles).

1. technical and economic feasibility of potential alternatives, including information on product performance, the price differences between lead containing bullets, gunshot, pellets, fishing tackle and their alternatives, the number of products that could be affected, expected costs and timelines for full-scale production of the alternatives, etc.;

Technically, there are available ammunition-alternatives for most uses in shotguns. The challenge is primarily that a large part of shotguns are not constructed to/safe to use with all the alternatives. Some of the alternatives to lead shot are also up to 10 times more expensive than lead shot cartridges.

For hunting with rifle there are some alternatives in certain calibres suitable for big-game hunting. The main technical problem with non-lead bullets in hunting ammunition is related to the smaller calibres, 6,5 and smaller. In the smaller calibres, non-lead bullets (e.g. copper og brass alloys) are getting very long due to lower mass than lead. Longer bullets needs a higher twist rate than lead bullets to stabilize, in order to be precise. In the larger calibres, it is possible to use a bit lighter non-lead bullets in order to get them stable, but that is more problematic in the smaller calibres.

The calibre 6,5x55 is the most common in Norway, both for big-game hunting and competitive shooting. This calibre does not meet the required impact energy for big game hunting when using non-lead ammunition. Competition shooting with non-lead ammunition in this (and smaller) calibres, will probably require that at least the barrels in all the firearms are changed.

In rimfire ammunition (22.lr) there are no suitable non-lead competition ammunition available.

The cost of non-lead rifle competition ammunition is somewhat uncertain, and there are in general no suitable non-lead competition ammunition available.

Older/historical/black powder firearms are in general not safe to use with other bullet materials than lead.

1. availability of alternatives in sufficient quantities on the market: current and future trends;

Alternatives to lead in shotgun ammunition is available for most hunting applications. Steel shot is the preferred alternative used on the clay shooting ranges, as lead is banned on the ranges.

Rifle ammunition for hunting  
**Large calibres (7mm and larger): some non-lead alternatives in most calibres  
Smaller calibres: (6,5 and smaller): some non-lead alternatives in some calibres. For some calibres/uses there are virtually no alternatives.**

There is virtually no competitive alternative non-lead rifle ammunition for competition/training on the market, regardless of calibre.

1. hazard and risk of the use of alternatives, including any impacts on animal welfare;

A transition to use of non-lead ammunition will require new risk assessments at several topics. Use of non-lead rifle ammunition at ranges might require new requirements regarding backstops (possible danger of ricochets e.g.).

The risk/effects of increased amounts of copper (and other metals in alternatives) in the runoff from backstops, are not sufficiently assessed.

Possible health effects regarding fumes from the use of certain types of non-lead ammunition must be considered more thorough. (e.g. Norwegian army personnel getting metal fever symptoms after using non-lead ammunition, probably due the increased barrel abrasion of the hard steel core bullets, but other factors regarding the non-lead ammunition might also contribute to the problems.)

Reports from hunters that have used non-lead rifle bullets for hunting big game assume that some of the available non-lead hunting bullets does not have the same killing efficiency as lead-based bullets in the same calibre (e.g. reports from professional hunters in Norway shooting approx. 1500 reindeer during 2017-2018, when eliminating a herd of reindeer after an outbreak of CWD) The Norwegian Food Safety Authority question the efficiency of the non-lead bullets used:

*“****Assessment of gunshot injuries*** *60 animals have been observed inside the hall on the base area. In many of the animals examined, it is difficult to observe gunshot injuries and assess gunshot wounds because no external bullet holes are observed. In such cases, parts of the animal must be skinned / cut to ascertain where the wound channel is. This coincides with information from the crews (professional hunters) that the homogeneous, unleaded bullets used in many cases give poor shot reaction and that there are no blood traces of injured animals. It is also reported that the animals follow the herd for a while even after hits in vital organs. The Norwegian Food Safety Authority's impression is that these bullets expand to a very small extent when they do not hit large bones. Although this ammunition is approved for use on large game hunting in Norway, there is reason to reconsider whether it is the right choice for this reindeer harvest.”  
Source:* [*https://www.mattilsynet.no/dyr\_og\_dyrehold/dyrehelse/dyresykdommer/skrantesjuke\_\_cwd\_/tilsynsrapport\_091218122017\_baseomraadet\_paa\_hemsedalsfjellet.28976/binary/Tilsynsrapport%2009.12.-18.12.2017%20baseområdet%20på%20Hemsedalsfjellet*](https://www.mattilsynet.no/dyr_og_dyrehold/dyrehelse/dyresykdommer/skrantesjuke__cwd_/tilsynsrapport_091218122017_baseomraadet_paa_hemsedalsfjellet.28976/binary/Tilsynsrapport%2009.12.-18.12.2017%20baseområdet%20på%20Hemsedalsfjellet)

In total it is several uncertain hazards and risks related to non-lead ammunition. Even if it is a general goal to replace lead in ammunition, it will not be a proportionate measure at this stage. More research and development are needed on non-lead ammunition in the relation to the impact on the environment, animal welfare, precision and safety of guns, range safety etc. Focus on good implementation of “best practice” regarding handling of game shot with lead ammunition, will ensure a level of risk management that makes a ban on lead ammunition unjustified.

1. other potential impacts stemming from the use of alternatives, e.g., discontinuation of certain products, changes in product performance, etc.

The Norwegian Association of Hunters and Anglers is positive to the use of non-lead ammunition e.g. for big game hunting, as long as the alternatives are as good as, or better than the lead-based ammunition. In some calibres (especially in rifle ammunition) there are no alternatives available, and there is a concern that the number of alternatives in less common calibres will be very limited (or discontinued because development of alternatives will not be profitable for the producers). There is also a concern regarding the future of some of the most common calibres in the Nordic countries, if e.g. 6,5mm calibre will not meet the requirements for hunting big game, as e.g. moose. (Due to lower impact energy than required by the hunting regulations in Norway, caliber 6.5 is not approved for use on big-game hunting with non-lead ammunition.  
  
We find that, until enough good risk management evidence has been obtained both at shooting ranges and when hunting, a general ban on lead in ammunition is not proportionate or justified. **Different countries have different environments and different challenges – and the appropriate measures to ensure that the risk of lead in the environment is controlled, should be taken at a national level.** Such approach would also be more in line with the principle of subsidiarity.

**Question 4**: Information on other socio-economic impacts in response to a possible restriction

1. costs and benefits to affected actors, e.g. producers, professionals, consumers (including producers of alternatives). Please provide data on key economic parameters, such as profit-loss, turnover, the number of people employed, current share of products containing lead, etc.

Most shotguns older than 20-30 years are not proofed for using steel shot or other high performance non lead shot, eg. tungsten shot. **It is estimated that there in Norway are up to 500 000 shotguns amongst the hunters that are older than the year 1990**. The use of non-steel proofed shotguns for clay shooting with steel shot will rarely result in a firearms explosion, but it is very common that the guns get bulges near the muzzle – especially if the shotgun is equipped with tight chokes (which is common on older shotguns). In other words – non-steel proofed shotguns are frequently getting damaged even by using light steel shot loads for clay shooting, and the value of the guns are ruined. High performance steel/tungsten shot must never be used in non-steel proofed guns, as the result can be catastrophic. Ruined value of older shotguns, and the need to buy new shotguns, is a substantial cost for an average hunter.

Many rifles will need at least a barrel change to perform with alternative materials that are lighter than lead. This will specially apply to rifles in calibre 6,5mm and smaller. The cost of replacing barrels in maybe more than 100 000 rifles just in Norway (not an unreasonable estimate), to make them suitable and accurate with non-lead ammunition, is substantial. (changing a rifle barrel will normally cost 500 – 1500 Euro, and will quite often equal the price of a new gun). Another aspect of using non-lead rifle ammunition is the possibly decreased lifetime of a rifle barrel. The use of steel core bullets, as used/tested by e.g. the Norwegian army, substantially decrease the lifetime of the barrel (in addition to the problems related to metal fumes from such ammunition).

Older/historical/black powder firearms are in general not safe to use with other bullet materials than lead. Changing barrels etc. to accommodate for using non-lead ammunition is not an option in historical guns, as the actions in general is not suitable for high pressure cartridges.