Department for
Business, Energy
& Industrial Strategy

CALL FOR EVIDENCE: LASER POINTERS

Government response

January 2018

Contents

Introduction

The Call for Evidence on understanding the market for laser pointers ran from 12 August until 6 October 2017. It sought evidence on the nature and scale of hazards associated with the use of laser pointers and how these could best be addressed.

Concerns around the sale and use of laser pointers have been growing in recent years, as laser pointers become both cheaper and more powerful. The Call for Evidence set out the government's current understanding of the market for laser pointers and the current legal framework for ensuring these are safe. It asked for comments on the nature and scale of the issues with laser pointers. It also sought evidence on the state of the market for laser pointers (including high powered laser pointers), views on potential changes to the legal framework (including whether there is evidence which would support the introduction of a licensing regime), and views on whether further awareness raising about the hazards associated with the product was required.

While the nature of a Call for Evidence like this means that there is a risk that only those who already have a pre-existing interest or concern in the area are likely to respond, the high level of professional consideration and quantitative evidence given by respondents is a rich source of evidence to draw upon when considering courses of action to take. Stakeholders who contributed to the Call for Evidence were in general highly knowledgeable about concerns regarding laser pointers, and many stakeholders backed up their assertions with scientific data.

Responses gave a picture of the market for laser pointers, and the ways in which UK consumers accessed high powered laser pointers. They also provided comments, suggestions and evidence on what actions government could take to effectively address these issues.

The Call for Evidence document was developed in collaboration with Cabinet Office, the Department for Transport, the Home Office and the Department for Health, drawing on evidence from the Health and Safety Executive, Public Health England, Newcastle City Council Trading Standards, and The National Trading Standards Intelligence Team.

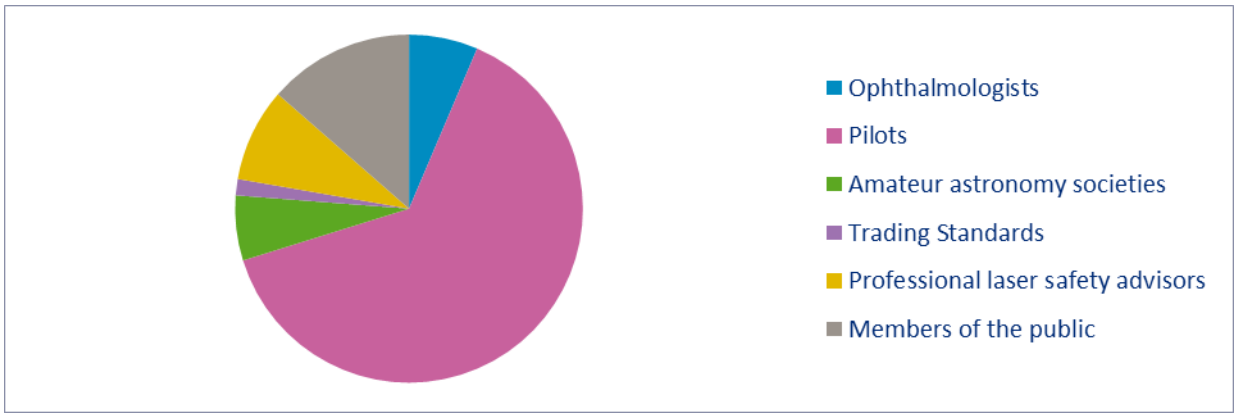
Responses received

265 responses were received. The Call for Evidence was available on GOV.UK and responses were received via email, post, and Citizen Space. The Call for Evidence was shared through key stakeholders' mailing lists and was presented at the annual Laser Safety Forum hosted by Public Health England in September 2017.

Responses received were broken down along the following stakeholder groups:

- *Ophthalmologists*: Including consultant paediatric ophthalmologists, retinal surgeons, the Royal College of Ophthalmologists, and The College of Optometrists. 17 responses (6% of total)
- *Pilots*: including pilots for UK based airlines, and representatives of UK airlines and UK airports. 169 responses (64%)
- *Amateur astronomy societies and other users of laser pointers*: this was the only group of responses received, along with some members of the public, that represented consumers and users of laser pointers. 16 responses (6%)
- *Trading Standards authorities*: 4 responses (2%)
- *Professional laser safety advisors*: professionals working in the laser safety industry, including laser safety advisors, university academics, and representatives of other governments who are engaged on this issue. 23 responses (9%)
- *Concerned members of the public*: 36 responses (14%)

Responses received



Nature of the problem

Responses to the Call for Evidence show that there are two types of laser pointer hazards:

1. Permanent damage to eyesight from retinal burns caused by high powered laser pointers, mainly in children; and,
2. Risk to flight safety when a pilot is dazzled or distracted by a laser pointer attack, from laser pointers of any power.

These two issues are of interest to different stakeholder groups and have different causes and proposed solutions.

Vision damage caused by high powered laser pointers

The issue of damage to vision caused by laser pointers was raised universally by ophthalmologist respondents, as well as by many laser safety professionals. Data shows[1] that the incidents of damage to vision as a result of laser pointer misuse has increased in recent years, due to increasing availability of higher powered lasers at a lower cost. Damage to vision occurs when a high powered laser pointer is shone into the eye, causing retinal burns. In a minority of cases, the damage caused by a laser pointer has been so severe that it has led to severe vision loss and sight-threatening conditions.

Call for Evidence responses indicate that this damage predominantly affects children and young people under 20. Children are at greater risk of laser pointer injuries than adults as they are intrigued by their appearance, are less likely to understand the dangers or use them safely and, in addition, may lack protective mechanisms of blinking and gaze aversion that adults exhibit[2].

To be strong enough to cause damage to vision, the laser pointer would have to have been of a significantly higher strength than permitted in the UK for general sale. In most cases where the source of the higher strength laser was known, it had been bought online, or overseas whilst on holiday. In cases where the laser pointer was able to be examined, it was found that laser pointers were a higher power than labelled.

Call for Evidence responses indicated that in these cases, neither children nor parents had been aware of the risks posed by laser pointers.

"If lasers are looked at, even if only for a few seconds, acute and chronic damage to the macula, the central area of the retina used for detailed vision, may occur. The long term damage shows up on retinal Optical Coherence Tomography (OCT) scans. The visual acuity can be dramatically reduced as well as colour vision, and significant permanent visual impairment can occur. There is little in the way of effective treatment."[3]

[1] Call for Evidence response (ophthalmologists and representative bodies)
[2] *Ibid.*
[3] *Ibid.*

Laser attacks against aeroplanes in flight

There was a significant response to the Call for Evidence from pilots who were concerned about laser pointer attacks. There have been no recorded cases of damage to vision of pilots from laser attacks (laser pointers directed from the ground at planes in flight). Due to the broadening and weakening of the laser beam light with distance, there is no risk of permanent vision damage. Rather, the danger comes from the distraction that laser pointers can cause to pilots. Any strength of laser pointer, down to ‘safe’ pointers under 1mW, pose some degree of risk.

All of the pilots who had responded to the Call for Evidence had themselves been victims of laser attacks, usually more than once. Many pilots said that they had experienced attacks outside of the UK, in countries both within and outside of the EU.

There is no meaningful data on who the perpetrators are, where they have obtained the laser pointers used, or what strength laser pointers they have used.

The market for laser pointers

Enforcement authority evidence

When lasers are strong enough to cause eye damage, but are not a specialist tool, there is a product safety issue. Enforcement action has been taken on this basis in relation to a large number of high powered laser pointers coming into the UK. However, most of the injuries reported to the Call for Evidence come from laser pointers not bought through the UK high street but purchased primarily online or overseas. The challenge is that most higher strength lasers are bought from manufacturers or suppliers based outside the UK (and even the EU), in relation to whom it is more difficult for local authority Trading Standards and other authorities to take enforcement action. There is a clear online market for high powered laser pointers that are being supplied to consumers in the UK, a significant number of which are being supplied without the correct or appropriate information, classification or output markings.

Local authority Trading Standards, as well as laser safety professionals, astronomers, ophthalmologists, and the general public, recognised that online sales directly from an overseas manufacturer, and small scale private imports of laser pointers, are extremely difficult to monitor. There is no separate customs code for laser pointers, nor do sellers generally label their laser pointers as such.

A small number of domestic retailers of laser pointers were identified by the Call for Evidence, with no significant stakeholder responses from either retailers or manufacturers of laser pointers. This is in keeping with the identification by all respondents of online sales from third country manufacturers as the primary source of laser pointers.

"Evidence shows that there are still a large number of products being supplied in the UK that have labelling non-compliances and are of a class of laser that should not be sold to the public. Gaps in knowledge by reputable producers / importers on meeting the legal requirements widely exists. However, we have seen that a large proportion of importers have no regard for the law and/or awareness of any guidance."[4]

Other users and consumers of laser pointers

Members of astronomy societies and individual members of the public provided further evidence of what legitimate uses there may be for high powered laser pointers and concerns around laser pointers, and the ways in which they were accessible to general non-specialist consumers.

Astronomy societies

The only stakeholder group who responded primarily as users of laser pointers were members of astronomy societies. Amateur astronomers use laser pointers to point out constellations. Responses generally indicate a power of <1mW to 5mW is sufficient for this purpose, though this ranges up to 50mW. Astronomers have a clear understanding of the risks of laser pointers, both to aircraft and to eyesight, and ensure that all society members know how to use laser pointers safely.

[4] Call for Evidence response (trading standards association)

Astronomers' concern was for legitimate users of laser pointers to not be unduly burdened by a heavy-handed licensing system, or restrictions on laser pointer ownership that would be most likely to impact upon already law abiding and legitimate users of laser pointers.

"We have a safe laser policy which members of the society are required to sign. We also inform all local air bases, air ambulance and police before each event."[5]

Individuals

The individuals that chose to respond to this call for evidence were, in general, concerned about the safe use of lasers and of the increasing reports they had read in recent years of laser attacks on planes. There was a greater awareness on risk of laser pointers to flights, as opposed to risk to vision which was rarely mentioned.

Almost every individual respondent provided anecdotal evidence of the ease with which they had bought/ imported high powered laser pointers into the UK. Some respondents also noted that the laser pointers they own are labelled as being lower strength than they really are. There was little awareness of the detail of current regulation (e.g. classification of laser strength by class), despite the group being self-selected as those who are interested in lasers or who have used lasers.

[5] Call for Evidence response (astronomy society)

Actions for government to take

Respondents to the Call for Evidence provided comments, evidence, and suggestions on what actions could address the issues raised. The following are the actions that government will take in response to the evidence gathered in the Call for Evidence.

Provide additional support for enforcement activities around the import of high powered laser pointers

Government will take action to improve frequency and resourcing of enforcement activities at ports and borders with the aim of improving safety of the market for laser pointers and increasing enforcement activities against imports of dangerous high powered laser pointers.

We will work with local authority ports and borders teams to prioritise the checking of imports of laser pointers coming into the UK. We will allocate a grant of £100k to local authority teams to ensure an immediate and targeted impact on noncompliant importers. BEIS will co-ordinate this activity and ensure local authority teams have access to the necessary scientific, technical and testing expertise.

We will also work with the online retailers through their established Primary Authority arrangements to support stricter policies and more effective policing of laser pointers advertised for sale online.

Encourage more effective voluntary labelling of laser pointers

BEIS will work with manufacturers and retailers to ensure that legitimate products have clear labels, indicating they must not be pointed at eyes or at aircraft. Voluntary labelling by legitimate retailers will improve consumer awareness of sources of safe products and should clearly state the power level of the product. Supporting voluntary labelling is expected to be as effective as requiring mandatory labelling in this case.

Professional laser safety advisors and ophthalmologists were among those who called for labels that were not only accurate regarding the power of the laser, but that were meaningful to consumers. For example, labels that made explicit the danger to eyesight and aeroplanes rather than the ‘class’ or even ‘mW power’ labelling which may be meaningless to non-specialist consumers.

BEIS will work towards achieving this through encouraging retailers and manufacturers to develop a voluntary code of practice. BEIS will also work with Primary Authorities with relationships with online retailers to adapt their sales policies regarding laser pointers.

“While many people also ignore labels, a warning about aircraft should be on there for parents or others who may read and heed them. Also, in court, a stronger case can be made against a person who is in possession of a laser that clearly states something like “Illegal and unsafe to aim at aircraft. With regard to retinal hazards, labels seem designed for lab scientists and not necessarily the general public. A word such as “Class 3R” means nothing to the non-expert.”[6]

[6] Call for Evidence response (laser safety professional)

"For all laser pointers, we recommend a warning sign that can be understood by the public (particularly) children. Laser safety classification is complicated and would be meaningless to many users, especially children. The sign should indicate that directing the laser beam to a human or animal (pet) face is forbidden."[7]

Promoting public awareness on the hazards of laser pointers, focusing on danger to eyesight

Ophthalmologists and professional laser safety advisors strongly advocated for increased public awareness and education of laser pointer hazards. Ophthalmologists strongly advocated a public health campaign, targeted at schools and that could be re-run annually. This was also supported by professional laser safety advisors. Some respondents suggested where in the primary school curriculum laser pointer safety could be taught. The need to make explicit to parents that laser pointers can be dangerous and are not a toy to be given to children was also emphasised.

The awareness raising would aim to reduce incidence of eye injuries caused by high powered laser pointers. This would address the point made by some respondents that in the case of children's eye injuries, often neither children nor their parents have been aware of the danger of pointing a laser at the eye. Government will look at educating school children, as well as exploring the provision of advice to travellers to consider safety of products bought abroad (many laser points which have caused injuries have been bought by tourists on overseas holidays). We will also promote safe laser handling messaging through stakeholder channels.

"Lasers have become increasingly common within our society and will continue to do so. This should be reflected in our education system… We run science workshops in primary schools where we bring a laser and discuss its properties and the related safety concerns with the children. In our experience, the children are very receptive."[8]

Addressing pilots' concerns through the Laser Misuse (Vehicles) Bill

Many pilots called for the strictest restrictions, licensing and penalties around laser pointer possession and misuse. They stressed the seriousness of such attacks and many expressed the view that it was 'only a matter of time' before a laser attack resulted in a significant accident. Some pilots supported raising awareness of the danger of shining a laser pointer at a plane and of the penalties that could be incurred by doing so. On the other hand, some pilots expressed wariness with regards to a potential public awareness campaign, fearing that this could serve to increase copycat laser attacks.

The most significant demand from pilots – for a harsher penalty for laser attacks on planes – is addressed in the government's Laser Misuse (Vehicles) Bill currently going through Parliament. The Bill creates a new offence of shining a laser at aircraft and other modes of transport, which directly and effectively addresses the concerns raised by pilots in response to the Call for Evidence.

[7] *Ibid.*
[8] *Ibid.*

Other options considered

Legislative action to introduce a licensing system restricting purchase and ownership of high powered laser pointers

Call for Evidence against a licensing system

Overwhelmingly, responses suggest that (perhaps with the exception of astronomers) there is no reason a member of the public needs a high powered laser pointer. However, the evidence gathered from the Call for Evidence does not indicate that a ban or licensing regime would have a positive impact towards this goal. Professional laser safety advisors provided data-backed evidence in this area. The evidence gathered shows that laser pointer bans or licensing systems have had the opposite effect to that which was intended, i.e. rates of laser attacks have gone up as a result of restrictions on laser pointers.

Australia and New Zealand have both taken legislative action to impose a ban or strict licensing system on high powered laser pointers. In both cases, introduction of restrictions was followed by all-time high levels of laser attacks on aircraft. Call for Evidence responses indicate that this was likely due to increased awareness of the malicious potential of lasers by the public, rather than any increased reporting.

In 2014, strict controls on the sale of high powered laser pointers were introduced in New Zealand. Recorded attacks on planes dropped briefly in 2015 before rising to an all-time high in 2016.[9]

In 2008 a number of states in Australia banned possession of laser pointers over 1 mW, and instituted a licensing scheme where astronomy educators and a few others could legally obtain a laser. This did not reduce the number of lasing incidents; in fact they rose from 138 in 2008 and 211 in 2009, to an average of 539 per year for the next six years.[10]

Introducing legislation to licence the supply and purchase of high powered lasers is highly unlikely to have the desired impact as it would not tackle illegal imports purchased online from overseas manufacturers as personal imports, or bought overseas when on holiday. Responses to the Call for Evidence showed that high powered laser pointers that are already prohibited from sale in the UK are easily bought online directly from the manufacturer. A licensing system would not target the illegitimate market in unsafe laser pointers and would impact on legitimate sellers and purchasers that use high powered lasers for technical and scientific purposes.

"The prohibition laws may have detrimentally affected laser pointer safety within Australia without overtly impacting availability....the one thing more hazardous than a correctly labelled high power laser pointer is a high power laser pointer labelled as safe."[11]

[9] *Ibid.*
[10] *Ibid.*
[11] *Ibid.*

To place a ban on advertising of laser pointers

Respondents to the Call for Evidence noted that laser pointers were not advertised domestically; the only advertising that they were aware of was through online vendors that would not fall under domestic legislation as they are not UK-based.

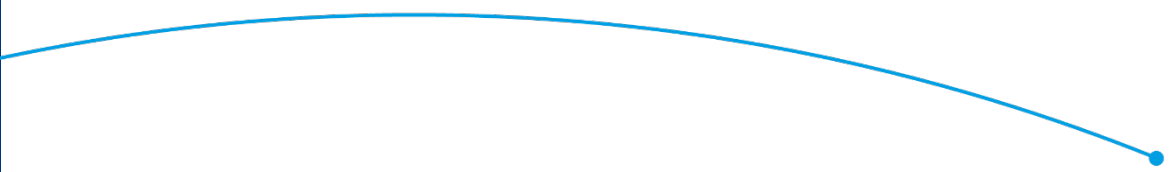
Laser pointers themselves have been given to children as toys, but online and domestically they are marketed towards adults. Anecdotal evidence in Call for Evidence responses say that they are marketed to children in holiday destinations such as Egypt and Mediterranean countries, which is outside the scope of our regulatory framework.

Conclusion

The evidence gathered in response to the Call for Evidence was carefully considered in agreeing the above actions. Respondents shared professional expertise, academic research, and personal experience. The actions will help meet the objective of increasing consumer safety by improving the safety of the laser pointer market and raising consumer awareness of laser pointer hazards.

Next steps

Government will implement the actions outlined above. This will involve working across government departments, with stakeholders including laser safety professionals, and Trading Standards Authorities. Increased market surveillance and enforcement activities, in partnership with improved labelling and awareness raising among consumers, will be a significant step towards lowering prevalence of incidents caused by misuse of laser pointers and unsafe laser pointers.



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