

Supplementary written evidence submitted by Fuse, The Centre for Translational Research in Public Health (END0028)

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On behalf of the HYPER study team, Dr Amelia Lake welcomed the opportunity to give oral evidence to the House of Commons Science and Technology Select Committee on 12/06/18. Since that date, our research team has welcomed the announcement that government will consult on a ban on sales of energy drinks to children in the recently published [Childhood Obesity: A Plan for Action Chapter 2](#). We welcome this proposed sales restriction and are sure that our written and oral evidence will support this.

Some additional points discussed below, as well as a response to Monster's supplementary written evidence.

1. [What sets energy drinks apart from other sugary drinks? What should we be most concerned about? Sugar, Caffeine, other ingredients?](#)

Energy drinks (EDs) are set apart from other sugar sweetened beverages (SSB) by their caffeine content, their cheap cost and wide availability.

- EDs are one category of SSB, characterised by their high caffeine content (>150mg/ litre).
- Their use is likely to be detrimental to children (C) and young people (YP) in the short and long term.
- Health problems associated with consumption include: headaches, stomach aches & sleeping problems.
- ED consumption clusters with health-damaging behaviours – including binge drinking, smoking, illicit drug use, screen time and poor dietary behaviours.
- Childhood and Adolescence are periods of rapid growth therefore it's important to have adequate sleep and good nutrition.

[For references please see the introduction in our paper Visram et al 2017¹]

Over time, caffeine intake in children and young people has increased dramatically, much of this has attributed to the increased intake of energy drinks (Temple, 2009²).

Children are consuming higher concentrations of caffeine than adults. This quote from Temple 2009² illustrates this clearly; "When you examine intake of caffeine relative to body weight, children are consuming about 1.5 times the concentration of caffeine compared with adults."

Caffeine has an impact on sleep and behaviour (see Temple 2009² for a broad review of the evidence).

¹ <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0188668>

² <https://www.sciencedirect.com/science/article/pii/S0149763409000037?via%3Dihub>

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In addition to sugar and caffeine, energy drinks contain a cocktail of other ingredients. It is not clear if these exert behavioural or physiological effects or both (see evidence in paragraph 11).

2. Energy drinks contribute to physical and mental health in young people (obesity and dental caries) – are there any positives?

There may be some benefits in terms of sport performance, but these findings were based on small numbers of elite junior athletes and should be treated with caution. Most of the studies were based on self-report data. None were conducted in the UK and very few involved primary school-aged children [see our review of the evidence Visram et al 2015³].

See also Mora-Rodriguez et al (2014)⁴ who concludes that the evidence is weak. Moderate doses of caffeine (200-300mg) can improve mood but doses over 400mg cause anxiety, nausea, jitteriness and nervousness [see Temple 2009⁵ page 4].

3. What is the scientific evidence on safe limits for caffeine intake in children. See recent Systematic Reviews Ruxton (2014)⁶ and Wikoff et al (2017)⁷.

4. Are there any comparative studies looking at the harm from energy drinks compared with other caffeinated soft drinks? Are there any specific harmful effects?

We are unaware of any trials comparing energy drinks with other caffeinated soft drinks in children. In adults (n=18 aged 18- 40) Fletcher et al (2017)⁸ conducted a randomized, double-blind, caffeine-controlled, crossover study in healthy adults. The adults were given caffeinated drink or an energy drink. Energy drinks affect people's hearts and blood pressure differently than other caffeinated beverages. The authors stated; "Due to the fact that multiple ingredients in energy drinks have the ability to alter electrophysiological properties, their sole and concurrent use needs further scrutiny." (Fletcher et al, 2017⁸).

The American Academy of Paediatrics (2011)⁹ has stated *clearly* that energy drinks are not appropriate for children or adolescents; "Rigorous review and analysis of the literature reveal that caffeine and other stimulant substances contained in energy drinks have no place in the diet of children and adolescents."

³ <http://bmjopen.bmj.com/content/6/10/e010380>

⁴ https://academic.oup.com/nutritionreviews/article-abstract/72/suppl_1/108/1930535

⁵ <https://www.sciencedirect.com/science/article/pii/S0149763409000037?via%3Dihub>

⁶ <https://onlinelibrary.wiley.com/doi/abs/10.1111/jhn.12172>

⁷ <https://www.ncbi.nlm.nih.gov/pubmed/28438661>

⁸ <http://jaha.ahajournals.org/content/6/5/e004448>

⁹ <http://pediatrics.aappublications.org/content/early/2011/05/25/peds.2011-0965>

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5. Is there any evidence that energy drinks are being consumed instead of milk and water?

In children and young people, there is evidence of soft drink intake being associated with a decreased intake of milk and fruit juice (aged 2 to 18 years, N = 1,810, Harnack et al 1999¹⁰).

Fulgoni & Quann 2012¹¹ explored US NHANES sample across three decades. They reported an increase in soft drink consumption as age increased.

There is evidence that caffeine increases the intake of sugar sweeten beverages (SSB) (Keast et al 2015¹²). In a sample of 99 adults, a double-blind 6-week dietary intervention study was conducted. The authors concluded that “caffeine as an additive in SSB has the ability to increase the consumption of the food in a free-living population”.

6. Is there any evidence of young people skipping meals and having energy drink instead?

Our qualitative interviews with teachers and parents indicated that energy drinks have been used by children as breakfast substitutes (Visram et al Hyper final report¹³)

Larson et al (2014¹⁴) found a significant association between regular consumption and lower frequency of breakfast for girls.

7. Distinction between Energy Drinks and diet energy drinks – should they both be restricted?

Yes, both deserve to be restricted. They both contain caffeine and the cocktail of other additives.

8. What would be the pros and cons of a legal ban similar to Latvia and Lithuania?

There are clear advantages to having a blanket age restriction on energy drinks. So would ensure that a clear message is sent out that these drinks are harmful to children and young people. Our research¹⁵ suggested that there is confusion about these drinks. A ban is not a silver bullet but could be one of a number of measures to address the problems.

The disadvantages are that we increase their ‘value’ once they are restricted. Government would need to consult widely with children and young people about how best to implement the proposed restriction.

¹⁰ <https://www.ncbi.nlm.nih.gov/pubmed/10207395>

¹¹ <https://nutritionj.biomedcentral.com/articles/10.1186/1475-2891-11-92>

¹² <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4302390/>

¹³

http://www.fuse.ac.uk/media/sites/researchwebsites/fuse/HYPER%20report%20FINAL_September%202015.pdf

¹⁴ [https://www.jneb.org/article/S1499-4046\(14\)00082-7/fulltext#](https://www.jneb.org/article/S1499-4046(14)00082-7/fulltext#)

¹⁵ <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0188668#pone.0188668.ref006>

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9. If there would be such a ban what level of caffeine would you permit in drinks for under 16s?

Current evidence suggests 2.5mg/ kg/ day is a safe amount of caffeine for children and adolescents (see earlier evidence).

Ruxton has summarised this “Taking the average body weight of a five year old (20 kg), 10 year old (32 kg) and 16 year old (57 kg) girls from the UK growth charts, this would equate to a safe daily caffeine range of 50-80 mg for primary school children and around 142 mg for secondary school children.” (Ruxton 2013¹⁶).

To put this in context, A 500ml can of monster contains 160mg caffeine A 250 can of red bull contains 80mg caffeine and Sainsbury’s blue bolt 250 ml contains 75mg caffeine.

Reducing the can size may not be an effective strategy to reduce intake as we know children will bulk buy these drinks, particularly when they are on offer (see Visram et al 2017¹⁵).

10. Gendered advertising – any evidence of advertising to boys/ girls

There is a gender association with energy drinks (Visram et al 2017¹⁷). Boys are perceived to drink more energy drinks and do drink more energy drinks. According to the HBSC survey (England report 2014¹⁸), boys drink more energy drinks and consumption of energy drinks increases with age.

Our research identified association between energy drinks and gaming. There was clear gamification of energy drinks in games that may have been labelled as over 18s, however, our 10 year old participants were playing these games (Visram et al 2017¹⁷).

11. Response to Monster’s supplementary submission

Our unbiased, peer reviewed rapid evidence assessment and narrative synthesis of the evidence was published in the BMJ Open¹⁹. The evidence review focused on the physical effects and consumer attitudes of energy drink consumption by children and young people. The evidence reviewed in this work “demonstrates that the use of energy drinks by children and young people is associated with a number of adverse outcomes and health damaging behaviours.”

Our review was comprehensive, systematic and rigorous synthesis methods were used. A multidisciplinary team of independent academic researchers conducted this review, none of these individuals had competing interests.

Our evidence review¹⁹ and qualitative study¹⁷ found clear gender patterning of energy drink consumption. Our review¹⁹ reported that advertising and brand loyalty were “major influencers” on young people’s attitudes to energy drinks. In our qualitative research, both the younger and older age-groups (10-14 years) demonstrated strong brand awareness¹⁷.

¹⁶ Ruxton 2013 ‘Caffeine and Children Healthcare professionals’ views’

¹⁷ <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0188668#pone.0188668.ref006>

¹⁸ <http://www.hbscengland.com/wp-content/uploads/2015/10/National-Report-2015.pdf>

¹⁹ <https://bmjopen.bmj.com/content/6/10/e010380>

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Gendered branding and marketing also emerged as an influential factor in young people's consumption¹⁷. We have not explored coffee brand advertising in children and young people.

Energy drinks contain other substances such as guarana, ginseng and taurine in variable quantities which may generate uncertain interactions and exacerbate any risks (Sanchis-Gomar et al 2015²⁰).

A 2011 survey conducted across 16 European Union (EU) countries found that prevalence of ED consumption was highest amongst 10 to 18-year-olds (68%, compared with 30% of adults and 18% of younger children)²¹. This age group in the UK consumed more EDs on average than their counterparts in other EU countries (3.1 litres per month, compared with 2 litres). Recent analysis of international sales data indicated that sales of EDs rose sharply between 2010 and 2015, and that the UK had the second highest rate of ED sales per head globally²².

The number of adverse events from the consumption of EDs appears to be higher than from other sources of caffeine²³. A recent survey²³ of 2055 12-17 and 18-24 year olds in Canada found that 73% stated having ever consumed an energy drink. Of these 5.4% of respondents reported that they had experienced at least 1 adverse event, including fast heartbeat (24.7%), difficulty sleeping (24.1%), headache (18.3%), nausea/vomiting/diarrhoea (5.1%), chest pain (3.6%) and seizures (0.2%); 3.1% had sought or had considered seeking medical help for an adverse event. The prevalence of reported adverse events was significantly greater among energy drink consumers than among coffee consumers (36.0%) (odds ratio [OR] 2.67 [95% confidence interval (CI) 2.01-2.56]), as was the proportion who reported seeking or considering seeking medical help for adverse events (3.1% v. 1.4%) (OR 2.18 [95% CI 1.39-3.41]). Hammond et al's findings support the evidence that young people may be more vulnerable to the effects of caffeine. However, there is a difference between coffee and EDs. Hammond et al states that "the current findings suggest that adverse outcomes from energy drinks exceed the direct effects of caffeine alone."

In Canada in 2010, an Expert Panel on Caffeinated Energy Drinks was assembled by Health Canada²⁴. They made a number of recommendations, that the committee may like to review.

²⁰ [https://www.onlinencjc.ca/article/S0828-282X\(14\)01667-5/fulltext](https://www.onlinencjc.ca/article/S0828-282X(14)01667-5/fulltext)

²¹ Nomisma-Arete Consortium. External scientific report. Gathering consumption data on specific consumer groups of energy drinks. Parma, Italy: European Food Safety Authority, 2013.

²² ICCR. The International Chair on Cardiometabolic Risk Global Sugar-Sweetened Beverage Sale Barometer Brussels: European Healthy Lifestyle Alliance (AISBL); 2016. Available from: <http://www.ehla-europe.eu/blog/2016/05/31/the-international-chair-on-cardiometabolic-risk-global-sugar-sweetened-beverage-sale-barometer/>.

²³ Hammond D, Reid JL, Zukowski S. Adverse effects of caffeinated energy drinks among youth and young adults in Canada: a Web-based survey. *CMAJ Open*. 2018;6(1):E19-E25. doi:10.9778/cmajo.20160154.

²⁴ http://www.hc-sc.gc.ca/dhp-mps/alt_formats/pdf/prodnatur/activit/groupe-expert-panel/report_rapport-eng.pdf

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There is clear evidence that ED mixed with alcohol has even more detrimental effects. Marczinski et al report that ED mixed with alcohol (AmED) “may contribute to a high-risk scenario for the drinker. The mix of impaired behavioural inhibition and enhanced stimulation is a combination that may make AmED consumption riskier than alcohol consumption alone.”²⁵

It is clear that the Monster Energy Company in their recent submission disagree with our evidence presented in written form and the oral evidence given by Dr Lake. However, the BSDA (of which Monster is a member), in their oral evidence supported the scientific evidence. In addition, Monster’s products are labelled as not being suitable for children.

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²⁵ <https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1530-0277.2011.01464.x>