

ENERGY DRINKS

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Health Equalities Group 2017

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FOREWORD

An energy drink is a type of beverage containing high levels of sugar and caffeine and which is marketed as providing mental and physical stimulation. This is cause for concern as not unlike other soft drinks, the high sugar content in energy drinks is directly contributing to rising levels of obesity, CVD, type 2 diabetes and dental erosion.

The addition of caffeine to these drinks presents another problem, as it is an addictive stimulant. Adverse effects associated with caffeine consumption in large amounts include nervousness, irritability, sleeplessness and even arrhythmia (abnormal heart beat).

Knowingly or not, the marketing strategies of energy drinks companies mimic the campaigns of big tobacco, combining celebrity and an addictive substance to target children and adolescents – and establishing brand loyalty early in life.

However, energy drinks go one step further. By associating energy drinks with extreme sports with an implicit sense of danger, these products are positioned directly in front of young males; which in part explains why sales of energy drinks continue to increase against the general decline of soft drink consumption.

This document puts forward some recommendations in terms of policy, regulation and consumption to curb the adverse effects associated with regular consumption of energy drinks, in addition to dispelling some of the myths surrounding these drinks.

Michael Viggars

Drinking energy drinks
can cause the following

DROWSINESS
HEADACHES
NAUSEA
PALPITATIONS
DEPENDENCE

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ENERGY DRINKS

Introduction

Despite the general decline in sugar-sweetened beverages (SSBs), energy drinks (EDs) continue to grow in popularity in the UK, rising from 475 million litres sold in 2012 to 500 million litres in 2013, an increase of over 5% in 12 months [1].

They can be found in supermarkets but also in leisure centres, hospitals and bars and are readily available wherever you can find a vending machine.

In food labelling law, there is no legal definition of an 'energy' drink—as use of the term 'energy' would imply a nutrition / health claim.

Energy drinks are commonly understood to be non-alcoholic and can contain caffeine, taurine, vitamins and occasionally a combination of other ingredients (usually herbal supplements) marketed for their

perceived or actual benefits as a stimulant, for improving performance and for increasing energy.

Carbohydrates (in the form of sugar) are often found in large quantities though the literature does not specifically state this.

Standard soft drinks such as Coca-Cola and lemonade are not considered energy drinks as, in comparison to the high-caffeinated drinks such as Red Bull, Monster and Relentless, the volume of caffeine present is much lower.

Furthermore, energy drinks (e.g. Red Bull) should not be confused with isotonic beverages or "sports drinks" (e.g. Lucozade). Whilst both claim to be 'performance enhancers', there are several significant differences between them, both in terms of ingredients but also their branding and marketing.

Drink Type	Mg Caffeine
Can of cola (330ml)	40mg
Small can of energy drink (250ml)	80mg
Large can of energy drink (500ml)	160mg
Mug of instant coffee	~100mg*
Mug of filter coffee	~140mg*
Mug of tea	~75mg*

*Amount of caffeine found in common food and drink (*depending on how they are made).*

Retailers regularly display the two in close proximity, potentially misleading customers into thinking that they are similar products. Even online grocery shopping, that has the facility to categorise products, often fails to distinguish between the two.

Contents of energy drinks

Energy drinks contain a range of ingredients which may include caffeine, taurine, carbohydrate (in the form of sugar), artificial sweeteners, vitamins and a variety of herbal ingredients which add to the marketability of the product [2].

Energy drinks have been with us for nearly 20 years and come in a variety of shapes, sizes and concentrations. Different brands of energy drink can contain anywhere from 0—16g of sugar per 100ml and 50—550mg of caffeine per can or bottle, offering little or no nutritional value and are potentially harmful to health.

Whereas sports drinks can provide hydration and may replenish electrolytes; high levels of caffeine in energy drinks can cause dehydration, particularly as a first-time user.

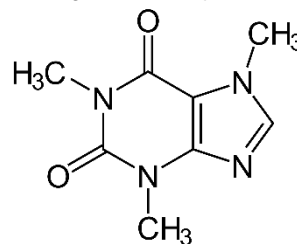
Both categories of drink tend to supply an

amount of carbohydrate (in the form of sugar) far beyond that recommended for physically active people, a problem compounded by sedentary lifestyles. Some retailers are beginning to substitute sugar in soft drinks with artificial sweeteners, as evidenced by diet and zero labelled products and the same is true with energy drinks.

Caffeine

Caffeine is a powerful stimulant derived from coffee beans, but it can also be synthesised in a laboratory. Caffeine acts by inhibiting adenosine (which is associated with sedation and relaxation) causing increased alertness and wakefulness.

Habitual caffeine use can lead to tolerance, diminishing its effects often to the extent that consumers experience disrupted sleep patterns and daytime sleepiness.



Above: Chemical structure of caffeine

The European Food Safety Authority (EFSA) state that:

“single doses of caffeine up to 200mg and daily intake of up to 400mg do not raise safety concerns for adults in Europe.”

However, it has been found that caffeine, at concentrations commonly found in regular sugary drinks, increases consumption [3].

Furthermore, although guidelines exist for adults there are currently no recommendations for caffeine consumption levels for children or adolescents a lack of data to derive a safe level of caffeine intake.

Taurine

Taurine is an organic acid found in high concentrations in your muscles, brain, heart and bloodstream. It helps to stabilise cell membranes and performs several anti-oxidant functions.

Taurine has also shown anti-anxiety effects following oral ingestion which may boost confidence and improve alertness.

Sugar

Sugars are simple carbohydrates and come in a variety of different forms. Fructose and Glucose are monosaccharides. Glucose is used as the primary energy source and enters cells with help of the hormone insulin.

Parents concern about added sugar in drinks was relatively low (40%) compared with their concern about other ingredients such as caffeine, artificial sweeteners and high-fructose corn syrup [4].

Long-term excess sugar consumption has been linked with weight gain, cardiovascular disease, the development of type 2 diabetes and dental decay with children and young adults being at particular risk, as they

consume more than any other age group on average.

Vitamins and Herbal Ingredients

Since energy drinks contain large amounts of sugar, B-Vitamins are touted as necessary ingredients to metabolise these simple sugars and produce energy [5].

The presence of sugar-free options now contradicts this justification.

Exotic herbal ingredients such as guarana, ginseng and ginkgo biloba are often emphasised in the marketing of energy drinks without merit.

The amount of herbal ingredients found in energy drinks is far below that expected to produce benefits or cause adverse effects and appear to be a marketing ploy.

This poses a significant problem both because consumers should be informed about what they are putting into their bodies and because guarana and others often contain caffeine, making it difficult to ascertain whether the products demonstrate a true caffeine content.

Consumption Levels

EFSA commissioned a report in 2011 to gather data on consumption of energy drinks in the 16 countries in the European Union [6].

In adolescents, prevalence of consumption was 68%, ahead of adults (30%) and children (18%).

The following page will describe consumption behaviour for:

- adults aged 19-65;
- adolescents aged 10-18; and
- children aged 3-10 years old

Adults

- Over a quarter (28%) of UK adults consume energy drinks (ED) citing the need for energy (40%), the need to stay awake (18%) and their taste (16%) as the main reasons for consumption.
- Consumption falls with increasing age and this could be attributed to generational differences and marketing aimed specifically at younger people.
- In total, 21% of UK adult ED consumers have 4-5 cans or more per week and over half consume EDs with alcohol.
- Some 12% of UK adult consumers will drink in excess of 1L at once exceeding the recommended daily amount of caffeine and sugar in one sitting.
- 88% of UK adult ED consumers practice sport citing endurance (40%), vitality (21%) and concentration as the main reasons for doing so.

Adolescents

- 69% of UK adolescents consume energy drinks citing taste (40%), energy (21%) and staying awake (17%) as the main reasons for consumption.
- Consumption is more common in males than in females, with consumption increasing with age.
- 19% of UK adolescent ED drinkers consume an energy drink 4-5 days per week or more.
- 35% of adolescents drink EDs and alcohol with consumption increasing with age.
- 65% drink EDs in relation to sports citing the need for endurance time at the maximum intensity (43%), power (21%) and vitality (12%) as the main reasons for doing so.
- 13% of UK adolescent ED consumers will drink in excess of 1L in one sitting.

Children

- 24% of UK children consume energy drinks citing taste (60%) and energy (31%) as the main reasons for consumption.
- More boys drink energy drinks than girls with consumption in both increasing with age.
- Consumption occurred at home (35%), during physical exercise (27%) and at parties (26%) most frequently.
- 55% of children understood that energy drinks and other SSBs such as Coca-Cola and lemonade are very different products; 19% thought they were the same thing; and 23% didn't know.
- No data was available on the relationship between understanding and frequency of consumption.

Data taken from EFSA (2013). Gathering data on specific consumer groups of energy drinks [6].

Risks associated with ED consumption

The health risks associated with energy drink consumption are primarily related to their caffeine content although the volume of sugar present in some needs serious discussion. Overconsumption of caffeine can cause palpitations, hypertension, nausea and vomiting; and long-term consumption can lead to type 2 diabetes due to decreased sensitivity to insulin.

Children and Adolescents

Early research on energy drinks consumption in adolescents presents cause for concern [7]. Long-term structural and functional changes have been observed in the brain of adolescents for other neuro-active substances, including nicotine and alcohol, suggesting caffeine may also influence brain development.

Adolescent brains are more susceptible to psychoactive substances and the subsequent activation of reward centres, creating dependence. Signs of this include high intake despite being aware it may be a problem, persistent desire or unsuccessful attempts to cut down.

Symptoms of caffeine overconsumption include reduction in the length of sleep and sleep quality, which can be linked to poor performance at school; and withdrawal symptoms if consumption ceases.

Ironically, withdrawal creates some of the very symptoms energy drinks are purported to alleviate including concentration issues and fatigue.

Regular energy drink consumption was associated with higher levels of media use, video game use and cigarette smoking. There was also a significant association between energy drinks consumption and higher daily intake of SSBs [8].

A lower frequency of breakfast was found in girls who regularly consumed energy drinks, suggesting they are either monitoring their calorie consumption or simply feel an energy drink is enough to sustain them until lunch.

Shift Workers

Anecdotal evidence suggests that energy drink consumption is high in shift workers as a means for staying awake, remaining alert and reducing the likelihood of injury.

Whilst past research indicates that energy drinks are effective in counteracting sleepiness, active ingredients such as caffeine and the high sugar content may negatively impact sleep and may therefore be counter-productive.

Consumption of energy drinks in a simulated night shift reduced average sleep time by nearly 30 minutes, however next-day performance was unaffected. This indicates that one-time consumption of energy drinks may be effective for a single night-shift but it remains unclear what the long-term consequences may be.

Shift workers are at higher risk of developing cardiovascular disease, obesity and various cancers due to disrupted circadian rhythms. An example of a circadian rhythm is your body clock. When we have been awake for a long period, the need for sleep accumulates and we begin to feel tired and drowsy.

Overconsumption of high-sugar, high-caffeine energy drinks are likely to exacerbate problems related to sleep and work-time sleepiness in the long-term.

Alcohol

Even though energy drinks are a relatively new type of soft drink, both soft drink companies and individual bars and clubs

have quickly established them as an integral part of nightlife, particularly amongst young people who often mix energy drinks with alcohol.

This has coincided with longer licensed serving hours in the UK, with many bars and clubs open until 4am.

Drinkers therefore need more 'stamina' to keep drinking, stay awake longer and subdue the effects of alcohol—creating an unprecedented demand for energy drinks.

Marketing of EDs

Big tobacco has historically used celebrity to endorse their products and the nicotine present in cigarettes to create dependence, transforming teenage usage into a lifelong habit.

There are blatant similarities between big tobacco and the strategies employed by energy drinks companies with young athletes offering celebrity and caffeine delivering the dependence.

This combination provides a long-term commercial interest for establishing brand loyalty early in life—in other words marketing aimed at children and adolescents.

The British Soft Drinks Association's (BSDA) voluntary code of practice states that energy drinks may not be promoted or marketed to persons under the age of 16 [10]. However, this has been especially difficult to police.

Red Bull has been extremely proficient in manifesting its brand. The tagline, 'Red Bull gives you wings', in conjunction with attractive visuals and clever audio, is very aspirational in tone, vowing to increase energy and subsequently success—something that young students are under increasing pressure to achieve.

Furthermore, Red Bull is intimately linked

with extreme sports from Formula 1 to cliff diving and Air Races to BMXing, adding to its 'coolness'. Red Bull have also penetrated established sporting markets, having recently set up New York Red Bulls football club and owning FC Red Bull Salzburg.

Parental Influence

In the EFSA report on energy drinks consumption, around one third of children indicated that they consumed energy drinks at home, so it is important to consider the role parents play in consumption.

Munsell *et al.* [11] found that nearly all parents provided SSBs for their child and the number increased with age. Despite this, most parents understand that the products are not healthy, however parents' beliefs about how healthy energy drinks and sports drinks are does not correspond with public health recommendations. A plausible explanation for these purchases despite public health warnings is the aggressive marketing.

Whilst energy drink sales grew 5.1% in 2013 the value of the market increased by 2% suggesting that price competition continues to be fierce, forcing premium brands to respond with promotions and price cuts further enhancing their appeal as a cheap treat.

Labelling Rules

The Foods Standards Agency in line with EU regulation [10], states that drinks containing more than 150mg of caffeine per litre (mg/l) must be labelled with:

'High caffeine content: not recommended for children or pregnant or breast-feeding women' ... in close proximity to the name of the product which must be accompanied by the amount of caffeine per 100ml.



Click the boxes above to see first-hand how energy drink companies market their products to children and adolescents.

The British Soft Drinks Association (BSDA) published a voluntary Code of Practice that suggests that the term 'consume moderately' (or similar words) should be included on the label and that such products should not be promoted or marketed to those under 16 years of age.

Sales / Restrictions

There are no legal restrictions on the sale of energy drinks to children in the UK. In February 2015, Morrisons ended a trial ban on the sale of energy drinks to children under the age of 16 despite receiving a lot of support from schools and teachers.

Morrisons refused to comment on the impact of the ban claiming that some adolescents over the age of 16 had had trouble purchasing energy drinks as they do not routinely carry proof of age.

Recommendations

Immediate measures should be put in place to ensure that the risks associated with energy drinks are well known to the public both in terms of caffeine and sugar overconsumption.

The marketing and communications of energy drinks and associated collateral must be more heavily regulated to adequately protect children and adolescents [11 & 12].

The following pages will set out policy recommendations in terms of the definition and reference intakes (RI) of energy drinks and their constituents; education and awareness; and marketing / age restricted sales / labelling best practices.

Recommendations on consumption will follow in addition to viable alternatives for energy drinks.

Definitions and Reference Intakes (RI)

- To ensure clarity and informed consumer choice the Food Standards Agency (FSA)

should define what constitutes an energy drink, an isotonic beverage or 'sports drink' and other 'functional' beverages.

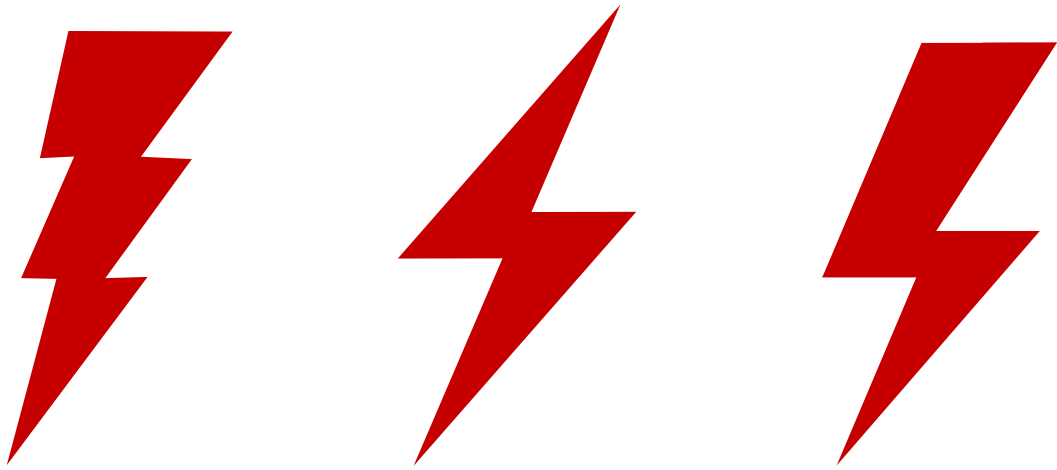
- Moderate caffeine consumption is considered by the FSA to be around 300mg per day. Currently only pregnant women are advised to limit their caffeine consumption to around 200mg per day, or two cups of coffee.
- Daily caffeine consumption limits for children and adolescents are required in addition to adults and pregnant women.
- An evidence-based, upper limit for the amount of caffeine allowed per 100ml must be introduced and restrictions on the maximum size of an energy drink would help to discourage overconsumption.

Education and Awareness

- Health practitioners should be aware of the potentially dangerous consequences of excess caffeine consumption.
- They should be able to identify symptomatic caffeine overconsumption and educate families on the risk associated with overconsumption.

Marketing / Age Restricted Sales / Labelling Best Practices

- Industry-wide standards must be implemented for responsible marketing of energy drinks.
- All energy drinks manufacturers should cease marketing of their products to children and adolescents under the age of 16 and closely monitor content distributed via social media.
- Restriction of sales to under 16s should be considered and retailers encouraged to do so voluntarily due to the potentially harmful adverse and developmental effects of caffeine on children.



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- Caffeine content should be displayed per serving and per 100ml on each individual can or bottle.
 - Assurance that energy drinks do not fall under the school definition of 'healthy drinks'.
 - All reporting of adverse events associated with energy drink consumption should commit to providing details both to the energy drinks manufacturer, the FSA and the Department of Health to improve our understanding of the consumption and health effects associated with energy drinks.
- are naturally present in syrups and unsweetened fruit juices should account for no more than 5% of our energy intake, half that of current recommendation [14].
 - Children should be encouraged to drink water and low fat milk to stay hydrated.
 - We can also take on water through consumption of fresh fruit and vegetables.
 - In regards to sports, both children and adults should start each session well hydrated and drink water in response to thirst.
 - During high intensity exercise, adults can lose up to 1L of water per hour and it is important to replace these fluids once exercise is completed.

Consumption Recommendations

The volume of caffeine and sugar present in many energy drinks far exceeds what is required nutritionally to the point that it may be detrimental to health.

The Scientific Advisory Committee on Nutrition (SACN) have proposed new recommendations that sugars added to food by the manufacturer, or sugars which

Please refer the *gulp* resource on sports drinks for further information.



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