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Energy Drinks' Effects on Student-Athletes and Implications for Athletic Departments

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Submitted by: Russ Paddock - United States Sports Academy

Abstract

Worldwide, the market for so-called energy drinks has grown exponentially in the last decade. The primary targets of the industry's marketing campaigns are young adults, and college athletes are frequent consumers of the products. Campaigns promote consumption of energy drinks to enhance performance and suggest their addition to cocktails. Studies have shown college athletes to engage regularly in binge drinking; they are also, clearly, individuals eager to maximize performance. In this article, the ingredients of energy drinks are discussed and the dangers of combining those ingredients with alcohol are explored. In addition, recent research about energy drinks and athletic performance is reviewed. Specific implications for college athletic departments are discussed.

Energy Drinks' Effects on Student-Athletes and Implications for Athletic Departments

The worldwide market for so-called energy drink has grown exponentially in the last decade. The primary targets of the industry's marketing campaigns are young adults. As a result, university and college athletes are frequent consumers of the products. The effects of these beverages can be quite significant. Therefore, their use by student-athletes requires analysis, results of which administrators and coaches need to be aware of so that they can share this knowledge with student-athletes in need of direction. They should also track the current trends among student-athletes concerning energy drinks.

Caffeine is the main "energy" ingredient in energy drinks. Its ability to enhance performance, under certain conditions, has been well documented. Yet consuming too much caffeine often has negative effects on overall wellness. Elite athletes continually strive for enhanced performance, trying a variety of strategies to reach that goal. Incorporating energy drinks within a training regime may be one such strategy. Many of the marketing campaigns explicitly state that an energy drink improves functioning, implying that it can boost athletic performance.

Binge drinking, too, has a negative effect on wellness, and research findings indicate that student-athletes—to a greater extent than other students—display a propensity to engage in it. On college campuses today, students commonly use energy drinks as an ingredient in alcoholic cocktails. When they consume alcohol and large amounts of caffeine in combination, many students find themselves drinking more and becoming more intoxicated, which can lead to serious health and other consequences.

History of the Energy Drink

Energy drinks entered the North American beverage market with exotic names, catchy slogans, and expensive marketing campaigns and now occupy a significant portion of the industry. They have become available everywhere, offered alongside soft drinks in vending machines, convenience stores, and grocery stores. Their manufacturers say that, in addition to providing a boost in energy, the drinks promote wellness through medicinal properties (they usually contain vitamins and/or ingredients like ginseng, guarana, and taurine). In 2005 such claims prompted Health Canada (the department of Canada's federal government responsible for helping Canadians maintain and improve their health) to state,

"Energy drinks are meant to supply mental and physical stimulation for a short period of time" (Safe Use of Energy Drinks, n.d., Background section, ¶ 2). Whatever their intended use and purported benefits, consumers today consume energy drinks for a variety of reasons: to boost energy, quench thirst, mix cocktails. Moreover, consumers are constantly pioneering new uses, such as flavoring smoothies with popular energy drinks.

The term energy drink suggests activity, and the uninformed consumer may assume that such a drink would support physical exercise. Locating energy drinks on store shelves adjacent to traditional sports drinks like Gatorade and Powerade reinforces such an assumption of a positive relationship between their use and exercise. Caffeine, the main stimulant ingredient in most energy drinks, has been shown by research to offer questionable potential (at best) as a performance enhancer, in light of the broad variation in individuals' tolerance of it and also in light of an accompanying range of possible adverse effects (Caffeine—Performance, n.d.).

Drinks providing high doses of caffeine are not a new concept. Jolt cola, a precursor to today's energy drink phenomenon, was first distributed in the 1980s (Retelny, 2007). Jolt was not marketed as a medicinal health product as, to an extent, energy drinks are. But like energy drinks, it was and is laden with caffeine. The Red Bull energy drink, introduced in the United States in 1997, was the forerunner of the modern energy drink and remains the most recognizable brand in the industry (Retelny, 2007). However, it has considerable competition in today's marketplace: 500 new varieties of energy drink were introduced to the worldwide market in 2006 (Fornicola, 2007). According to Cohen (2008), the marketing research firm A. C. Nielsen indicated that worldwide sales of the drinks rose from $3.5 billion in 2006 to $4.7 billion in 2007. This speaks volumes for the drinks' profitability and potential new markets, chiefly within the young teen to young adult demographic. Many companies continue to introduce new drinks, hoping to capture a share of a growing consumer base. Responding to the influx of new products with which they must compete, manufacturers push the boundaries, producing drinks with increasingly complex combinations of medicinal ingredients, with ever higher levels of caffeine, served in larger sizes (Fornicola, 2007).

Ingredients of the Energy Drink

Content labeling has always been inconsistent across North America, and the steady stream of new products developed for the energy drink market further complicates the picture. Energy drinks' proliferation and popularity clearly caught regulatory agencies such as Health Canada off guard; by all accounts, agencies were ill equipped to respond to initial claims made by the drinks' various manufacturers. In Canada, most energy drinks have been approved since 2004 as "natural health products." Approval was a controversial decision, resulting in the establishment of Health Canada's Natural Health Products Directorate (Raging Bull, 2005). Dr. Eric Marsden of the Ontario Association of Naturopathic Doctors considers Red Bull to be like "sin in a tin" (Raging Bull, 2005, p. 2, All In a Label section, ¶ 8), making a mockery of proper natural health products. On the other hand, energy drinks' designation as natural health products means that, in Canada, they must be labeled with detailed information about amounts of medicinal and nonmedicinal ingredients and about recommended uses and doses, including cautionary statements.

In the United States, in contrast, the Food and Drug Administration (FDA), while it regulates caffeine content in soft drinks, does not regulate caffeine contained in energy drinks (Cohen, 2008, Anxiety Attacks section, ¶ 9). The FDA is authorized to move to regulate caffeine in energy drinks but tends not to do so unless a given product provides more caffeine than is found in the average cup of coffee (Cohen, 2008, Anxiety Attacks section, ¶ 10). In the United States, it is not required that manufacturers list the ingredients of energy drinks; therefore, it is difficult for consumers to appreciate how much caffeine they ingest with an energy drink. While the information often is available on the manufacturer's website, it is unlikely typical consumers are concerned about product ingredients to the point of visiting a website. Most take it for granted that a product is safe simply because it is found on the shelves of food stores. And yet, studies have suggested that people with high blood pressure or heart disease should avoid energy drinks. The American Heart Association issued an alert in November 2007 concerning dangers energy drinks pose to those with known cardiovascular issues (Lofshult, 2008).

The variety of energy drinks available makes a complete review of their contents a daunting task. Sugar (whether in the form of glucose, sucrose, fructose, or other compound) is found in most, and sugar's effects are well known. Sugar-free varieties of energy drinks are now being consumed in significant numbers, as well. In their study, Malinauskas, Aeby, Overton, Carpenter-Aeby, and Barber-Heidal (2007) found that 26% of college students who use energy drinks chose sugar-free versions; significantly more females than males opted for the low-calorie version. Sugar and sweeteners are household ingredients, but the various brands of energy drinks also contain many exotic components, as well. Four in particular seem central in the majority of the marketed products: caffeine, taurine, glucuronolactone, and vitamins.

Caffeine

The primary exotic ingredient of energy drinks is the stimulant drug caffeine. According to the website of the Sports Medicine Council of Manitoba (Caffeine—Performance, n.d.), there is scientific evidence that caffeine raises both heart rate and blood pressure, which can increase alertness and enhance performance of some tasks if small doses only are consumed. Caffeine's effects are such that it is included in the World Anti-Doping Agency's monitoring program, although the agency removed caffeine from its list of restricted substances in 2004 (Desbrow & Leveritt, 2007). The decision by the World Anti-Doping Agency implies that the performance-enhancing capacity of caffeine is limited; most research confirms that. Although caffeine in limited quantities improves mood and cognitive performance (Scholey & Kennedy, 2004), consuming more than limited quantities can generate many negative effects. As a result, any beneficial effect on athletic performance proposed for caffeine is not universally accepted.

The Sports Medicine Council of Manitoba (Caffeine—Performance, n.d., p. 2) indicated that a 250-ml can of Red Bull contains 80 mg of caffeine, while in caffeinated soft drinks the concentration ranges from 29 mg to 55 mg per 355-ml serving. Coffee's caffeine content varies, but it typically contains 100 mg per 250-ml serving (Fornicola, 2007). Popular energy drinks including Monster, Full Throttle, and Rockstar contain about the same amount of caffeine as Red Bull. Some manufacturers, however, in attempting to create a unique product, have added significantly more caffeine to certain niche energy drinks. An article in the *McLatchy–Tribune Business News* (Energy Drinks' Buzz, 2008) identified three drinks with extremely high caffeine levels: Boo-Koo Energy, with 360 mg of caffeine in 24 oz; Wired X344, with 344 mg in 16 oz; and Fixx, with 500 mg in 20 oz (Energy Drinks section).

When used in moderation, caffeine rarely produces visible effects, despite the fact that many negative effects have been identified in research. The acceptance and use of caffeine in contemporary society is commonplace, most caffeine being consumed without ill effect in morning coffee, to improve alertness and mood. Since coffee is generally served hot, it is generally drunk slowly. But energy drinks' good taste and chilled state mean they can be consumed quickly (Fornicola, 2007), allowing a high dose of caffeine to enter the body fairly quickly. Even moderate amounts of caffeine can lead to severe negative effects in people who are caffeine sensitive, as well as in children, with their relatively low body weight. High doses of caffeine can negatively affect concentration, attention, and behavior and can produce irregular heartbeat, nausea, restlessness, headache, and dehydration (Griffith, 2008). Even when dehydration is not a problem, choosing an energy drink over drinks like juice, milk, and water can deprive children of nutrients (and can deplete a parent's budget). Their students' increasing access to energy drinks is for good reason causing concern among school officials.

Taurine

The most widely used medicinal ingredient in energy drinks after caffeine is also, perhaps, the least understood: the amino acid taurine. The human body on its own replenishes its supply of taurine (Lidz, 2003, With Taurine section, ¶ 3), which is involved in several metabolic processes and may also have antioxidant properties (Raging Bull, 2005, p. 4, Medicinal Ingredients chart, ¶ 1). A typical person's intake of taurine is about 60 mg per day (Laquale, 2007), but a single serving of Red Bull (and of most other energy drinks) contains 1,000 mg of taurine. That amount is doubled in the 473-ml serving of Monster and nearly doubled (1,894 mg) in the same size container of Rock Star. Manufacturers imply that a special synergy exists

among energy drink ingredients, and certainly taurine would be key to it. Laquale (2007) challenges the synergy notion, suggesting that taurine's benefits were declared on the basis of testing on house cats in the 1970s.

The taurine in Red Bull has been promoted as the drink's secret and controversial ingredient. Research on the effects of taurine is limited and inconclusive. But taurine is the reason Red Bull's acceptance has been delayed in many countries; until recently it was actually illegal to sell Red Bull in Canada (Raging Bull, 2005). According to Lidz, Red Bull's manufacturer "admits that taurine's main function [in its product] is simply that of flavor enhancer" (2003, With Taurine section, ¶ 3). The German Institute for the Protection of Consumer Health suggests that claims of taurine's value are "misleading" (Lidz, 2003, With Taurine section, ¶ 3). Alford et al.'s study (as cited in Laquale, 2007) indicated that Red Bull improved aerobic endurance and anaerobic performance, but whether that resulted from caffeine or taurine (or the combination of the two) was not determined. Griffiths' research (also cited in Laquale, 2007) furthermore showed that consumers were being misled and that energy drinks' effects depended on how much caffeine they contained. At this point, not enough research has been done to substantiate any positive effect of taurine, much less to investigate long-term effects of consuming taurine in the amounts present in energy drinks.

Glucuronolactone

Glucuronolactone is a carbohydrate that occurs naturally in the body and, like taurine, is suspected of helping "detoxify the body" (Raging Bull, 2005, p. 4, Medicinal Ingredients chart, ¶ 2). Red Bull includes glucuronolactone to increase energy and feelings of well-being (Laquale, 2007). Not surprisingly, the hundreds of energy drink brands joining the market following Red Bull's introduction also contain glucuronolactone. Laquale notes that glucuronolactone has been made known by undocumented reports that it was given to American soldiers during the Vietnam War to increase energy but was eventually linked to deadly brain tumors and banned. Glucuronolactone research to date has focused on animals, making its effects in humans difficult to assess (Raging Bull, 2005, p. 4, Medicinal Ingredients chart, ¶ 2).

Vitamins

An assortment of B vitamins (B2, riboflavin; B3, niacin; B6; and B12) are the final ingredient common to the majority of energy drinks. While these vitamins' importance to healthy living is undeniable, it may be more appropriate to ingest them in the form of a balanced diet than in the form of an energy drink supplement.

Although U.S. products may not be labeled as to their ingredients, they may include some type of warning label with recommendations for use of the product.

Effects

The long-term effects of energy drink consumption are unknown. Many studies have analyzed extended use of caffeine, generating mixed findings—although moderate use of caffeine is commonly accepted to pose little health risk. Fornicola (2007) found that on average, adults consumed 200 mg of caffeine per day, the amount in about two cups of coffee. While caffeine is undoubtedly the greatest contributor to the effect produced by energy drinks, the fact remains there is no research into possible problems associated with long-term ingestion of high concentrations of taurine and glucuronolactone.

Red Bull states that short-term positive effects of the drink—of its particular combination of ingredients—are proven by publicly available academic studies (FAQ, n.d., What proof is there that Red Bull energy drink does what it says it does? section). But the Red Bull website does not provide links or directions for accessing those studies. The majority of the extant research clearly disputes the claims, essentially attributing to caffeine the quantifiable short-term effect of increased energy (Malinauskas et al., 2007). Caffeine is also a diuretic, however, and the manufacturer of Red Bull recommends that users of its product drink ample amounts of water when they exercise (FAQ, n.d., Is Red Bull Energy Drink Suitable As Fluid Replacement? section).

There remains considerable concern regarding the negative effects of energy

drinks. Emergency room visits arising from energy drink consumption are becoming commonplace. For example, *Child Health Alert* reported a 23-year-old was hospitalized with a dangerously high heart rate after consuming the energy drink GNC Speed Shot followed by a Mountain Dew soft drink, also containing caffeine (Caffeine: Watch Out, 2008). The report noted that the GNC Speed Shot website does warn against using the product together with others that contain caffeine. There are countries, France, Denmark, and Norway among them, that continue to ban the sale of Red Bull. Several highly publicized deaths linked to energy drinks have fueled ongoing suspicion. In one such tragedy, a healthy 18-year-old Irish basketball player experienced cardiac arrest after consuming four cans of Red Bull prior to a game (Laquale, 2007).

Consumption Patterns

Malinauskas et al. (2007) stated that energy drinks are intended for young adults but that little formal research is available accurately describing the multibillion-dollar energy drink industry's actual clientele. Studying energy drink consumption by college students, Malinauskas et al. found that 51% used energy drinks, defined as consuming more than one energy drink monthly during the academic semester in which they were surveyed. In Canada, energy drinks labeled as natural health products must provide cautions complying with requirements of Health Canada's Natural Health Products Directorate. For example, the beverages are not recommended for nursing or pregnant women, caffeine-sensitive persons, or children. Product labeling also establishes a maximum daily dose and advises against mixing the beverages with alcohol. An analysis of the labels on three popular energy drinks found that all delivered the same messages except when offering a maximum daily dose. Red Bull and Rock Star advise consumers not to exceed 500 ml of the product per day, while Monster recommends no more than 1,000 ml per day.

It is not clear how many adults consume energy drinks, but it is certain that, despite manufacturers' warnings, many children are regular consumers. The Florida Poison Control Center started to track cases of caffeine overexposure after 39 people ages 2 to 20 years developed symptoms between January 2007 and March 2008 (Cohen, 2008, Anxiety Attacks section, ¶ 3). A school nurse in California sent three students to hospital by ambulance in the past year because they had irregular heart rates brought on by consumption of energy drinks (Dorsey, 2008). Energy drinks are not recommended for children or adolescents nor are they marketed directly to them. But surprisingly, there is currently no restriction on children's purchase of energy drinks, even though caffeine's effects are more pronounced in children than adults, due to body size and tolerance. It is furthermore clear that children and adolescents contribute significantly to the total market. Some schools have banned energy drinks from school property, and many jurisdictions are considering attempting to restrict energy drink sales to children.

Marketing

Energy drinks are marketed with colorful descriptions and provocative names that make them sound fun and exciting. Rockstar, Monster, Full Throttle, Throw Down, and Sobe No Fear are just a sampling of the inviting products that fill store shelves. Marketing slogans are developed to stimulate interest in a product and distinguish it from its competition: "Get spiked," "Party like a rockstar," and "Feel the freak" are slogans representing the marketing strategies of energy drink companies. The language and images of such advertising are not directed at mature adults. If anything, the marketing of energy drinks removes all ambiguity about whom these products are meant to appeal to: teens and young adults.

With 40% of the market share, Red Bull remains the leader in energy drink sales (Agriculture and Agri-Food Canada, 2008, Background section, ¶ 2). Not surprisingly, the "Red Bull gives you wiiings" slogan is widely recognized. Red Bull has developed its image over the past decade by sponsoring extreme sports and targeting college students (Lidz, 2003, Red Bull's Effects Have Been Recognized by World-Class Athletes section, ¶ 3-4). More than other brand's marketing, Red Bull's marketing has created a connection between the product and sports and fitness, with the implication that greater performance in athletics is achieved by those who consume Red Bull. Currently, Red Bull containers feature the phrase "Vitalizes body and mind." Lidz (2003) identified other slogans from Red Bull that have made a connection to sports: "increases concentration," "improves reaction speed,"

"stimulates metabolism," and "Red Bull's effects have been recognized by world-class athletes." Miller (2008) suggested that other manufacturers have copied Red Bull's strategy, since "energy drink advertising consistently emphasizes a physically active lifestyle featuring a range of extreme sports" (p. 481). Miller further suggested that, in their appeal to the young, energy drink marketing strategies are similar to those of the tobacco and alcohol industry (p. 488). Such an affinity between a "healthy natural product" and smoking and drinking is incongruous.

Consumption Among Student-Athletes

Malinauskas et al. (2007) found that 51% of college students consume energy drinks, so logic would dictate that student-athletes in colleges and universities consume the product at a similar or perhaps higher rate, given the marketing-constructed connection between energy drinks and sports. Promotional statements for Red Bull suggest consuming the product prior to a demanding athletic contest like a race or game (FAQ, n.d., When Should Red Bull Energy Drink Be Consumed? section). Also suggesting student-athletes' susceptibility to energy drink marketing is Miller's confirmation (2008) of the phenomenon called *toxic jock identity*. Miller defined toxic jock identity as the state of having "a sport-related identity predicated on risk taking and hyper masculinity" (p. 481). Toxic jock identity may increase risky behaviors, and consuming energy drinks may be a predictor of the phenomenon (Miller, 2008). The drive to improve athletic performance and exhibit one's athletic identity could influence student-athletes to consume energy drinks at a relatively high level compared to that of the general student body.

Consumption to Boost Athletic Performance

Does ingestion of an energy drink really boost athletic performance? Caffeine is the only ingredient in energy drinks that has been studied in depth and that shows proven effects; short- and long-term effects of high doses of taurine and glucuronolactone require additional study. Athletes have long used caffeine prior to training sessions and competitions, but most nevertheless do not well understand how the drug works, for example that, as a diuretic, caffeine is capable of aggravating the dehydration athletes may experience during competition. The scientific literature itself provides mixed messages about caffeine's performance-enhancing capability and its value prior to exercise. Fornicola (2007) stated that no real need exists to use energy drinks for performance advantage and that that quick caffeine fix is not a very intelligent strategy. In contrast, the website of the Sports Medicine Council of Manitoba reports that endurance athletes might gain some advantage by exploiting caffeine to derive energy from fat early in a competition, thereby leaving more muscle glycogen available to provide energy later on (Caffeine—Performance, n.d., p. 1). However, the website also advises athletes that "4% dehydration equals 20% of performance lost" (p. 1). Caffeine promotes dehydration, so the amount of it to be ingested for athletic advantage would have to be determined very precisely. Desbrow and Leveritt (2007) demonstrated that the majority of elite triathletes use caffeine to improve physical performance and concentration. However, these athletes' knowledge of which products contain caffeine (and how much they contain) was limited (Desbrow & Leveritt, 2007). Umaña-Alvarado and Moncada-Jiménez (2005) studied the effects of energy drinks on male athletes' aerobic activity, finding no performance improvement from energy drink consumption prior to testing. However, their results did demonstrate that those participants who consumed energy drinks reported lower levels of perceived exertion.

Consumption With Alcohol

Studies show student-athletes are more prone to binge drinking than other students. Grossman, Wechsler, Davenport, and Dowdall (1997) found college athletes engaged in binge drinking and used chewing tobacco at higher rates than nonathletes, although they were less likely to smoke cigarettes or marijuana. Other research indicates that team sports participants are especially likely to consume alcohol in a high-risk manner (Brenner & Swanik, 2007). Such findings, particularly when considered in light of something like toxic jock identity, suggest that the newly popular practice of mixing energy drinks into alcoholic cocktails may place student-athletes at an elevated risk. Consuming energy drinks along with alcohol lessens the subjective sense of intoxication (O'Brien, McCoy, Rhodes, Wagoner, & Wolfson, 2008). This means one can consume more alcohol than usual because one doesn't feel intoxicated. In addition, the alcohol-induced fatigue that normally

tends to limit further alcohol consumption may be masked by the caffeine in the energy drink (Dunlap, 2008).

Although energy drink companies may caution consumers against mixing the products with alcohol, young people, especially, do so. According to Miller (2008), the website Drinknation.com contained 201 Red Bull–based alcoholic beverage recipes. And despite the Red Bull label's warning about mixing the product with alcohol, the manufacturer's website tells visitors that Red Bull can be used for more than nonstop partying (Benefits, n.d., Red Bull—More Than Just a Myth section, ¶ 3).

Combining a depressant (alcohol) with a stimulant (energy drink containing caffeine) clearly could exacerbate the typical risks of alcohol consumption. The practice, combined with the tendency of student-athletes to binge on alcohol, should raise concern. O'Brien et al. (2008) indicated that "students who reported consuming alcohol mixed with energy drinks had significantly higher prevalence of alcohol–related consequences, including being taken advantage of sexually, taking advantage of another sexually, riding with an intoxicated driver, being physically hurt or injured, and requiring medical treatment" (p. 453). Further, the U.S. Surgeon General has reported that in the United States, close to 5,000 people under age 21 die each year of alcohol-related injuries (Dunlap, 2008).

Consumption in Conjunction With Studying

Long before the introduction of energy drinks, students used caffeine to stay up late at night studying. Today student-athletes who do not like the taste of coffee can choose an energy drink instead. In moderation, use of energy drinks to sustain a study session would appear to be harmless. Nevertheless, coaches and athletic department staff should make sure student-athletes are familiar with caffeine's potential negative effects (when it is consumed to excess), in order to help them make informed and responsible choices, whatever the circumstance.

Consumption Representing Casual Use

Casual consumption of energy drinks accounts most significantly for the rapid rise in their popularity. Now available everywhere, energy drinks strike many consumers as a choice akin to a soft drink or coffee. The market seems poised for continued expansion, supported by aggressive marketing. The consumption of energy drinks is likely to become even more common and socially acceptable. Student-athletes are likely to be part of the trend, increasing their consumption, especially if they lack complete information about energy drinks, their ingredients, and their actual effects on athletic performance and health.

Summary and Conclusions

Given the proliferation of energy drinks and their growing popularity despite possible negative effects, coaches and athletic department administrators should take the initiative in educating student-athletes about the products. Energy drinks are aggressively marketed to college students with messages touting the performance and other benefits of consuming the beverages. Students are urged be energy drink consumers, and for the uninformed student-athlete, the trend's influence may produce negative consequences.

While the purported benefits of the taurine and glucuronolactone in energy drinks are unproven, potential positive and negative effects of another common ingredient, caffeine, are well documented. The choice to use caffeine prior to training or competition should belong to the individual, based on adequate knowledge of pros and cons and on past experiences with caffeine. Student-athletes who choose to use caffeine should be encouraged to do so in moderation. They should also be provided information about levels of caffeine contained in various foods and beverages, in order to monitor their intake. Most energy drinks in fact have not contained more caffeine than a cup of coffee, but there is a noticeable trend toward selling the beverages in larger containers—meaning larger servings and more caffeine. If consuming an energy drink before a competition improves mood and concentration, it would be difficult to suggest that it poses significant danger. Assuming a consumer is not caffeine-sensitive, caffeine's negative effects are unlikely to become evident unless intake becomes excessive. Although deaths associated with energy drink consumption and sport have been reported, they

seem to be isolated cases involving multiple servings with high levels of caffeine.

While it is important to provide student-athletes with accurate information on energy drinks and caffeine as these affect athletic performance, of greater concern to athletic departments should be the growing trend of combining energy drinks and alcohol. Take the not uncommon pattern of student-athletes, dehydrated by the effort of playing a game, gathering after that game to consume alcohol. If the alcohol is mixed with caffeinated energy drinks, the student-athletes are subjected to a double diuretic effect, since alcohol, like caffeine, has diuretic properties. Thus they further compromise hydration.

Moreover, energy drinks' capacity to mask intoxicated feelings allows increased alcohol consumption, which in turn increases the likelihood that a young drinker will make the kind of choices that have negative, if not disastrous, results. Evidence suggests that energy drink consumption with and without alcohol remains on the increase, so educating student-athletes on all aspects of energy drink consumption needs to become an athletic department priority, to ensure both wellness and safety.

References

Agriculture and Agri-Food Canada. (2008). Agri-Food Trade Service: The Energy Drink Segment in North America, January 2008. Retrieved July 10, 2008, from http://www.ats.agr.gc.ca/us/4387_e.htm

Benefits (n.d.). Retrieved July 10, 2008, from the Red Bull website: http://www.redbullusa.com/#page=ProductPage.Benefits

Brenner, J., & Swanik, K. (2007). High-risk drinking characteristics in collegiate athletes. Journal of American College Health, 56(3), 267-272.

Caffeine—Performance enhancement or hindrance? (n.d.). Retrieved June 30, 2008, from the Sports Medicine Council of Manitoba website: http://www.sportmed.mb.ca/uploads/pdfs/Caffeine%20good%20and%20bad.pdf

Caffeine: Watch out for "energy drinks." (2008, May). Child Health Alert, 26, 2-3.

Cohen, H. (2008, April 2). Kids + energy drinks = dangerous mix. The Miami Herald. Retrieved June 5, 2008, from http://seattletimes.nwsource.com/html/health/2004322357_zhea02energy.htm...

Desbrow, B., & Leveritt, M. (2007). Well-trained endurance athletes' knowledge, insight, and experience of caffine use. International Journal of Sport Nutrition and Exercise Metabolism, 17(4), 328-339.

Dunlap, L. (2008). Wake up to the facts: Energy drinks and alcohol don't mix. The Journal of the Air Mobility Command's Magazine, 17(2), 20-21.

Energy drinks' buzz may pose some risk. (2008, January 30). McClatchy–Tribune Business News. Retrieved June 5, 2008, from the ProQuest database.

FAQ (n.d.). Retrieved July 10, 2008, from the Red Bull website: http://www.redbullusa.com/#page=ProductPage.FAQS

Fornicola, F. (2007). Energy drinks: What's all the "buzz" about? Coach and Athletic Director, 76(10), 38-43.

Griffith, D. (2008, May 11). Energy drinks make caffeine the drug of choice among California youth. Sacramento Bee. Retrieved June 5, 2008, from http://search.ebscohost.com/login.aspx?direct=true&db=nfh&AN=2W62W663951...

Grossman, S. J., Wechsler, H., Davenport, A. E., & Dowdall, G. W. (1997). Binge drinking, tobacco, and illicit drug use and involvement in college athletics: A survey of students at 140 American colleges. Journal of American College Health, 45(5), 195-200.

Laquale, K. (2007). Red Bull: The other energy drink and its effect on performance. Athletic Therapy Today, 12(2), 43-45. Retrieved October 5, 2008, from the SportDiscus database.

Lidz, F. (2003). The fuel of extremists (or, taurine in your tank). Sports Illustrated, 99(4), 8-16.

Lofshult, D. (2008). Energy drinks may present danger. Idea Fitness Journal, 5(4), 58.

Malinauskas, B. M., Aeby, V. G., Overton, R. F., Carpenter-Aeby, T., & Barber-Heidal, K. (2007). A survey of energy drink consumption patterns among college students. Nutrition Journal, 6(1), 35.

Miller, K. E. (2008). Wired: Energy drinks, jock identity, masculine norms, and risk taking. Journal of American College Health, 56(5), 481-490.

O'Brien, M. C., McCoy, T. P., Rhodes, S. C., Wagoner, A., & Wolfson, M. (2008). Caffeinated cocktails: Energy drink consumption, high-risk drinking, and alcohol-related consequences among college students. Academic Emergency Medicine, 15 (5), 453-460.

Raging bull: Health warnings over popular energy drink being brushed off? (2005, February 6). Retrieved July, 10, 2008, from the Canadian Broadcasting Corporation (CBC) website: http://www.cbc.ca/consumers/market/files/health/redbull/

Retelny, V. S. (2007). Energy drinks. Obesity Management, 3(3), 139-142.

Safe use of energy drinks. (n.d.). Retrieved June 20, 2008, from the Health Canada website: http://www.hc-sc.gc.ca/hl-vs/iyh-vsv/prod/energy-energie-eng.php

Scholey, A. B., & Kennedy, D. O. (2004). Cognitive and physiological effects of an "energy drink": An evaluation of the whole drink and of glucose, caffeine and herbal flavouring fractions. Psychopharmacology, 176(3-4), 320-330.

Umaña-Alvarado, M., & Moncada-Jiménez, J. (2005). Consumption of an "energy drink" does not improve aerobic performance in male athletes. International Journal of Applied Sport Sciences, 17(2), 26-34.

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