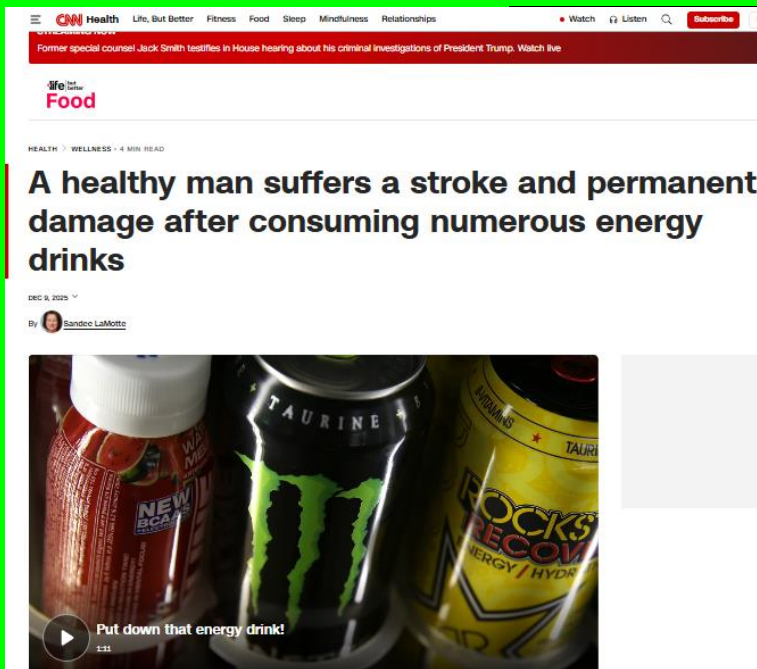


Trending Towards Trouble: Popular Health Fads Harming Your Heart

Energy Drinks, Electrolyte Mixes, and Supplements

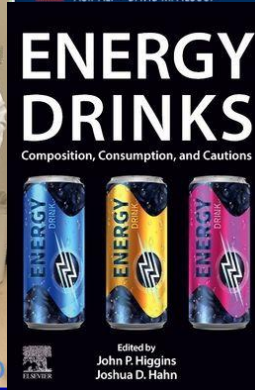
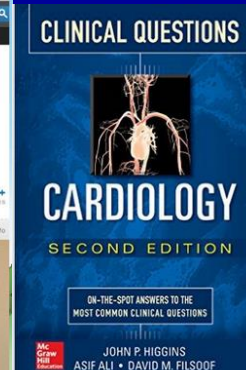
What Every Clinician Needs to Know in 2026



John P. Higgins MD, MBA (GWU), MPHIL (Cantab), FACC, FAHA, FACP, FACSM, FASNC, FSGC
Director of Exercise Physiology – Memorial Hermann Sports Medicine Institute
Division of Cardiology – Lyndon B. Johnson General Hospital
Professor of Medicine, McGovern Medical School at UTHealth, Houston TX

<https://www.cnn.com/2025/12/09/health/energy-drinks-harm-wellness>
<https://people.com/energy-drink-loving-gym-goer-28-has-fatal-heart-attack-11702802>

About Myself



Learning Objectives

- Recognize emerging health trends popular among younger adults – specifically use of:
 - Energy Drinks
 - Electrolyte Mixes
 - Supplements
- Understand mechanisms of harm
- Identify high-risk patient populations
- Learn about safer alternatives
- Apply evidence-based counseling in 5-minute clinic visits

Outline

- Opening Case
- Pre-Talk: MCQs
- Common Products Patients Use
- Energy Drinks
- Electrolyte Mixes
- Supplements
- Conclusions
- Post-Talk: MCQs

Opening Case

Opening Case

A few months ago, I saw a 28-year-old fitness enthusiast. Runs five miles 3 days a week and hits the gym 3 days a week — the picture of health. He came in for palpitations. “Nothing major... my heart just feels weird sometimes.” ECG: sinus rhythm — but a QTc 501 msec that made me pause. I asked about drugs. He laughed. “No way, doc. I’m super healthy.” Then I asked: “What do you take before workouts?” Answer: Two scoops of pre-workout, an energy drink on the way to the gym, a “natural” fat burner ordered online. Total caffeine? 500–700 mg + synephrine + yohimbine + ingredients not on the label. He thought he was optimizing performance. **He was stacking stimulants. This isn’t fringe behavior. It’s mainstream.** Energy drinks, electrolyte mixes, supplements — our patients don’t see them as drugs. *Physiologically, they are.*

Pre-Talk: MCQ

MCQ 1

A 26-year-old male who jogs about 12 miles/week reports intermittent palpitations. Denies syncope, chest pain, or dyspnea. He drinks 1-2 Monster® 24-oz energy drinks daily and mixes energy drinks with alcohol socially. Family history of thyroid disease. Vitals: BP 138/90 mmHg HR 70 bpm. Labs normal. ECG: sinus rhythm, early repolarization pattern, frequent PVCs.

Which is the MOST appropriate next step?

- A. Start beta-blocker therapy
- B. Coronary CT angiography
- C. Counsel stimulant/alcohol reduction and obtain 24-hr Holter
- D. Electrophysiology study
- E. Restrict from exercise

MCQ 2

A 34-year-old recreational runner presents with palpitations after workouts. She runs 30–40 minutes at moderate intensity and reports daily use of Force Factor Liquid Labs Energy Electrolyte Powder, a commercially available electrolyte mix containing sodium, sugar, and added “energy boosters.” She asks whether this is necessary for hydration.

Which recommendation is most appropriate?

- A. Continue electrolyte mixes to prevent exercise-induced arrhythmias
- B. Replace with plain water during routine exercise
- C. Increase electrolyte intake to reduce blood pressure variability
- D. Switch to a low-sodium sports drink with stimulants
- E. Use electrolyte mixes only if sweating is minimal

MCQ 3

A 28-year-old man presents with palpitations and lightheadedness after starting Inno Shred™ an over-the-counter “natural” supplement for weight loss and as a pre-workout supplement to enhance his gym performance. He denies drug use. ECG shows QTc prolongation. Electrolytes and thyroid studies are normal. He asks why this occurred after using Inno Shred™.

Which statement best explains his presentation?

- A. Dietary supplements undergo FDA pre-market safety testing
- B. Most supplements contain only labeled ingredients
- C. Undeclared stimulants are common in supplements
- D. Supplements are safer than prescription medications
- E. Cardiac toxicity occurs only with anabolic steroids

Common Products Patients Use

Common Products People Use

Energy drinks (20% YA & 10% 50+ consume weekly):

Sugar-Sweetened Energy Drinks, Low-/No-Sugar Energy Drinks, Functional Energy Drinks, and Energy Shots

Electrolyte mixes (30% of YA & 5% 50+ consume weekly):

Carbohydrate–electrolyte drinks, Low-/no-calorie electrolyte mixes, Hybrid formulas, and Medical-style rehydration

Supplements (50% of YA & 80% 50+ consume weekly):

Pre-Workout Supplements, Fat Burners / Weight-Loss Supplements, and Nootropic Supplements

YA = Young Adults = 18-34 yo

50+ = Adults 50+ yo

Vercammen KA et al. Am J Prev Med. 2019 Jun;56(6):827-833.
Laska MN et al. Public Health Nutr. 2015 Aug;18(15):2794-803.
Stierman B et al. NCHS Data Brief. 2021 Feb;(399):1-8.
Cowan AE et al. J Nutr. 2022 Dec 14;152(12):2789-2801.
Qato DM et al. J Nutr Gerontol Geriatr. 2022 Apr-Jun;41(2):124-147.

DSHEA: Classifies as foods

- The Dietary Supplement Health and Education Act of 1994 (DSHEA) is a U.S. federal law that defines and regulates dietary supplements.
- DSHEA classifies these products as a category of food, not drugs.
- Manufacturers generally do not need FDA approval before marketing a new dietary supplement.
- Under DSHEA, the **FDA has the burden of proof** to show that a product is unsafe and **poses a "significant or unreasonable risk of illness or injury"** before it can take action to remove it from the market.



Energy Drinks

<https://foodscientistforhire.com/top-energy-drink-ingredient-trends-in-2025-fuelling-the-future/>
<http://www.medicalnewstoday.com/content/images/articles/276/276736/illustration-of-a-heart.jpg> <https://www.youtube.com/watch?v=W1ZOB9i7Gik>

Energy Drinks: Overview

Energy drinks are commercially available beverages marketed to increase alertness or performance through stimulant ingredients

- Widely consumed by adolescents, young adults, and athletes
- Ingredients: At least 3 of (1) caffeine, (2) B-vitamins, (3) sugar, (4) taurine, (5) creatine, (6) quercetin, (7) guarana, (8) ginseng, (9) coenzyme Q10, or (10) branched chain amino acids.
- Caffeine content often exceeds that of coffee with variable labeling accuracy; frequently contain multiple stimulants (e.g., caffeine, coffee, taurine, guarana, Yerba Mate)

Energy Drinks: Overview

Major categories:

- Sugar-Sweetened Energy Drinks
- Low-/No-Sugar Energy Drinks
- Functional Energy Drinks
- Energy Shots

Clinical relevance: common contributor to palpitations, hypertension, arrhythmias, QT prolongation, and emergency department visits

Vulnerable: Youth, Pregnant women, Caffeine naïve/sensitive, Taking certain meds e.g. Adderall, Consumption within 1–2 hours of exercise increases arrhythmia risk

Higgins JP et al. Curr Sports Med Rep. 2018;17(2):65-72.
Higgins JP et al. Mayo Clin Proc. 2010;85(11):1033-1041.
Goldfarb M et al. Am J Cardiol. 2014;113:168–172
Shah SA et al. J Am Heart Assoc. 2019;8:e011318
Cohen PA et al. Circulation. 2020;141:e27–e52

Sugar-Sweetened Energy Drinks

Energy drinks formulated to deliver high-dose caffeine, sugar and other chemicals for alertness and performance.

Ingredients: caffeine, glucose/ sucrose, taurine, guarana, B-vitamins, creatine, quercetin, ginseng, Co Q10, BCAA.

Eg: Monster®, Red Bull®, Rockstar®, Ghost®, C4®

Risks:

- Tachycardia and hypertension
- Atrial and ventricular arrhythmias
- Sleep disturbance, anxiety, tremor
- Hyperglycemia and weight gain
- Endothelial dysfunction
- Increased long-term cardiovascular risk

Low-/No-Sugar Energy Drinks

Energy drinks using non-nutritive sweeteners as sugar substitute to deliver stimulant effects without calories.

Ingredients: Caffeine, artificial sweeteners (Sucralose, Acesulfame Potassium (Ace-K), Aspartame, Erythritol), taurine

Eg: Monster Energy Zero Ultra®, Celsius®, Red Bull Zero®, Alani Nu®, Ghost®, ZOA®, Prime®, Bang® Energy, Reign Total Body Fuel

Risks:

- Equivalent stimulant cardiovascular effects
- QT prolongation reported
- False perception of safety

Antonio J et al. Nutrients. 2024;17(1):67.

Higgins JP et al. Curr Sports Med Rep. 2018;17(2):65-72.

Cohen PA et al. Circulation. 2020;141:e27–e52

Functional Energy Drinks

Energy drinks marketed with more naturally derived caffeine and essential amino acids (EAAs), CoQ10 (a natural cofactor/coenzyme), or botanicals (coffee beans, green tea, guarana, and yerba mate).

Ingredients: Caffeine (from coffee beans, green tea, guarana, yerba mate), taurine, EAAs, L-carnitine, CoQ10, adaptogens (Ashwagandha, Rhodiola rosea, ginseng, reishi mushrooms)

Eg: ZOA®, Yerbae®, Runa®, LIFEAID®, FITAID®, V8 + Energy Celsius®, Bang® Noo Fuzion™ & Bang® Keto Coffee

Risks:

- Additive stimulant exposure (often underestimated)
- Potential herb–drug interactions and variable dosing
- Unproven benefit claims; false perception of safety

Energy Shots

Energy shots are small-volume, highly concentrated stimulant products designed to deliver large doses of caffeine and other sympathomimetic compounds rapidly, often without significant fluid, calories, or electrolytes.

Ingredients: Caffeine, B vitamins, amino acids

Eg: 5-hour Energy®, C4 Energy Shot®, Stacker®, Ketone-IQ®, Frog Fuel®

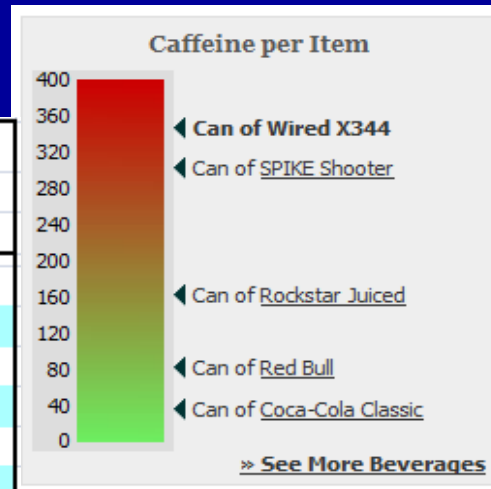
Risks:

- Rapid caffeine toxicity
- Hypertensive urgency
- Arrhythmias due to bolus dosing

Energy Drinks : Caffeine

Many go > 200 mg

Caffeine Content:	
Red Bull vs Common Soft Drinks	
12-ounce beverage	Caffeine (mgs)
Red Bull	120
Jolt	71.2
Pepsi One	55.5
Mountain Dew	55
Mellow Yellow	52.8
Tab	46.8
Diet Coke	45.6
Dr. Pepper	41
Big Red	38
Pepsi-Cola	37.5
Diet Pepsi	36
Coca-Cola Zero	35
Coca-Cola Classic	34
Vanilla Coke	34
Diet Cherry Coke	34
A&W Creme Soda	29



Caffeine: 50mg to 505mg per can or bottle

FDA soda limit = 71 mg/12 oz (energy drinks not capped)

e.g. 1 can Coca Cola=34mg caffeine.

Energy Drinks : [Caffeine]

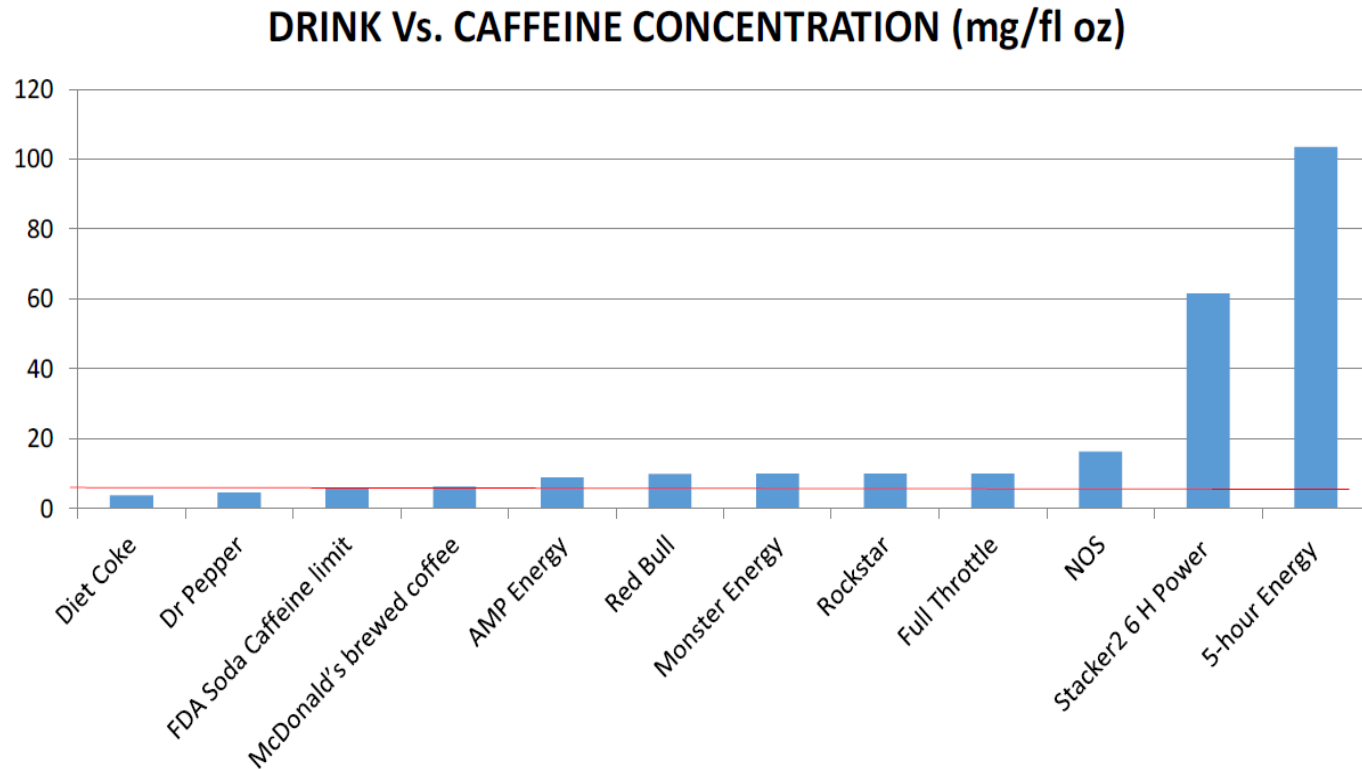


Figure 1. Various drinks and their caffeine concentration. Note red horizontal line specifies the FDA imposed limit of 71 mg caffeine/12 fl oz soda.

Energy Drinks

Non-CV Complications

System	Effect
Neurologic	Epileptic seizures Intracerebral hemorrhage Reversible cerebral vasoconstriction
Gastrointestinal	Nausea/vomiting Jaundice Elevated transaminases
Renal	Acute renal failure Rhabdomyolysis Dehydration
Endocrine	Obesity Hyperinsulinemia & reduced insulin sensitivity
Psychiatric	Acute psychosis Anxiety Insomnia Increased risk-taking behavior

Energy Drinks

CV Complications

Acute Effects	Potential Chronic Effects
Elevated Blood Pressure Increased Heart Rate QT Prolongation Supraventricular Arrhythmia Ventricular Arrhythmia Coronary Vasospasm Coronary Artery Thrombosis Takotsubo Cardiomyopathy Acute Coronary Syndrome (NSTEMI-ACS & STEMI) Aortic Dissection Postural Orthostatic Tachycardia Syndrome Sudden Cardiac Death Endothelial Dysfunction	Hypertensive Heart Disease Coronary Artery Disease Atherosclerosis Cerebrovascular Disease Peripheral Arterial Disease

Acute Cardiovascular Effects

1–2 h after drinking ED in healthy persons:

- ↑ systolic BP 6–10 & diastolic BP 3–6 mmHg
- ↑ heart rate 3–7 beats per minute
- ↑ QTc up to 22–25 ms
- ↑ in norepineprine of 74% (150 to 250 pg/mL)
- Energy drinks consumed within 1–2 hours of exercise amplify adrenergic stimulation and arrhythmia risk
- High-dose caffeine and sympathomimetics can provoke coronary vasospasm and supply–demand ischemia
- Effects are additive with other sympathomimetics

Higgins JP et al. *Beverages* 2015;1:104–126.

Goldfarb M et al. *Am J Cardiol*. 2014;113(1):168–172.

Higgins JP et al. *Mayo Clin Proc*. 2010;85(11):1033–1041.

Higgins JP et al. *Curr Sports Med Rep*. 2018;17(2):65–72.

Svatikova A et al. *JAMA*. 2015 Nov 17;314(19):2079–82.

Shah SA et al. *J Am Heart Assoc*. 2019;8:e011318.

Acute Cardiovascular Effects

Hemodynamic Effects

- ↑ Systolic BP: +6–10 mmHg ↑ Diastolic BP: +3–6 mmHg
- ↑ Heart Rate: +3–7 bpm

Electrophysiologic Effects

- ↑ QTc: +22–25 ms

Neurohormonal Activation

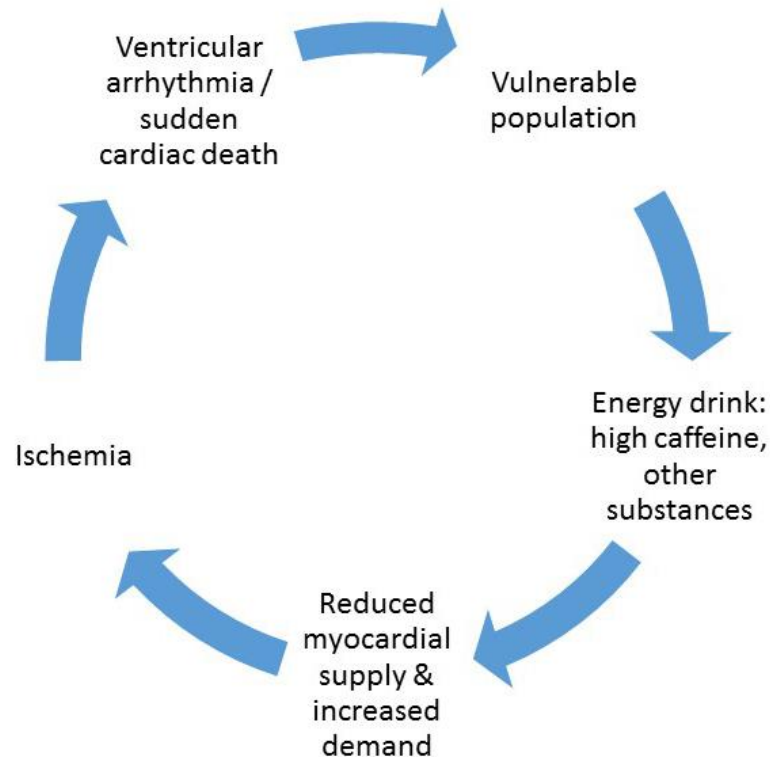
- ↑ Norepinephrine: +74% (150 → 250 pg/mL)

Clinical Implications

- Enhanced adrenergic stimulation
- Increased arrhythmia risk
- Coronary vasospasm and supply–demand ischemia
- Effects are additive with other sympathomimetics
- Risk ↑ when consumed within 1–2 hours of exercise

Acute Cardiovascular Effects

Possible Mechanisms Sudden Cardiac Death associated with Energy Drink Consumption



Energy Drinks:

Take-Home Points

- Energy drinks are stimulant beverages, not hydration or sports-nutrition products
- Caffeine & co-stimulants drive cardiovascular effects
- Avoid in patients with arrhythmias, uncontrolled HTN, structural heart disease, pregnancy, or children/adolescents (AAP/AAFP)
- Metabolic & neuro risks: excess sugar, weight gain, insulin resistance, anxiety, insomnia, seizures.

Red flags:

- Palpitations, syncope, chest pain, or exertional symptoms
- Multiple cans/servings, energy shots, or mixing with alcohol “wide-awake drunk” or pre-workout use (ask!)
- Concomitant QT-prolonging drugs/stimulant supplements



Electrolyte Mixes

<https://www.amazon.com/Gatorade-Quencher-Sports-Electrolytes-Rehydration/dp/B007F1NIAQ>
<https://www.walmart.com/ip/Force-Factor-Liquid-Labs-Energy-Electrolytes-Powder-Hydration-Packets-Fruit-Punch-Flavor-20-Stick-Packs/2465056688>
<https://www.amazon.com/LMNT-Zero-Sugar-Electrolytes/dp/B084HQ4DYQ>
<https://www.amazon.com/dp/B0BGR4FTZS>

Electrolyte Mixes: Overview

Electrolyte mixes are powders, tablets, or liquid concentrates dissolved in water to replace electrolytes—primarily sodium—lost through sweat.

- Sodium maintains plasma osmolality and intravascular volume
- Supports neuromuscular conduction and muscle contraction
- Enhances intestinal water absorption via glucose–sodium cotransport
- Key teaching point: Electrolyte mixes are functional hydration tools, not routine beverages
- Most people do NOT need electrolyte supplementation

When are Electrolyte Mixes Helpful?

Indications:

- Prolonged endurance exercise >60–90 minutes
- Hot or humid environments
- Heavy or salty sweaters
- Heat illness
- Significant gastrointestinal losses

Rationale:

- Sweat sodium losses: 500–2,000 mg/L
- Sodium improves fluid retention and thirst drive
- Reduces risk of exercise-associated hyponatremia

Product Categories & Examples

Carbohydrate–electrolyte drinks:

- **Gatorade, Powerade:** sodium + potassium + sugar
- Best for long, high-intensity endurance exercise

Low-/no-calorie electrolyte mixes:

- **LMNT, Nuun**
- High sodium, minimal sugar

Hybrid formulas:

- **Liquid I.V. (an oral electrolyte powder), Force Factor Liquid Labs** – enhanced absorption via glucose–sodium cotransport

Medical-style rehydration:

- **Gatorlyte, Pedialyte**

Potential Harms

- High-sodium products may contain 1,000+ mg per serving → BP elevation in salt-sensitive patients
- Added sugars → endothelial dysfunction & metabolic risk
- False perception of cardiovascular benefit
- Unnecessary caloric intake

Not indicated:

- Routine daily hydration
- Short, low-intensity exercise

Electrolyte Mixes: Take-Home Points

- Water is sufficient for most people and routine exercise
- Electrolyte Oral Rehydration Solution (e.g., Pedialyte) for illness-related dehydration; sports drinks for prolonged (≥ 60 min) vigorous exercise; electrolyte mixes are situational performance tools (match intake to exercise duration, intensity, heat, & sweat loss)
- Sodium–glucose cotransport improves absorption; zero-sugar mixes less effective during acute fluid loss
- Children/adolescents: routine use discouraged (AAP/AAFP); excess sugar $\rightarrow$ obesity & dental erosion

Red flags:

- Daily electrolyte use in sedentary patients $\rightarrow$ GI distress (bloating, diarrhea), dizziness, or muscle weakness
- High-sodium worsens hypertension, CKD, & heart failure



Supplements

Supplements: Overview

Unregulated supplements are products marketed to enhance performance, weight loss, or cognition.

- No pre-market FDA safety or efficacy testing
- Regulated under DSHEA (1994) — burden of proof on FDA
- Variable dosing and frequent undeclared ingredients
- Disproportionate use among young adults and athletes

High-risk categories:

- Pre-workout supplements
- Fat-burning / weight-loss supplements
- Nootropics (“brain boosters”)
- Clinical relevance = common cause of palpitations, hypertension, arrhythmias, and ED visits

Pre-Workout Supplements

Pre-workout supplements are stimulant-containing products taken before exercise to increase energy, focus, and perceived performance.

Ingredients: High-dose caffeine, Synephrine (bitter orange), Yohimbine, **DMAA / DMHA analogues*** (often undeclared), Beta-alanine, creatine (variable doses)

Often combined with energy drinks ('stacking').

Eg: C4®, Total War®, Bucked Up®, Ryse®, Lit®

Risks:

- ↑ Heart rate and blood pressure
- Atrial and ventricular arrhythmias
- QT prolongation and ischemia

***DMAA (1,3-dimethylamylamine) / DMHA (2-amino-6-methylheptane/octodrine) are powerful stimulant compounds related to amphetamine**

Fat Burners / Weight-Loss Supplements

Fat burners are supplements marketed to increase metabolism or suppress appetite through sympathomimetic stimulation.

Ingredients: Synephrine, Yohimbine, Green tea extract (EGCG), Caffeine combinations, Thyroid hormone analogues (occasionally adulterated)

Eg: Hydroxycut®, Inno Shred™, OxyElite Pro®, Burn-XT®, LeanFire®

Risks:

- Hypertension and tachyarrhythmias
- Myocardial ischemia
- Hepatotoxicity (notably with green tea extract)
- Often stacked with pre-workouts → additive toxicity

Nootropic supplements

Nootropics are supplements marketed to improve focus, memory, or mental performance.

Ingredients: High-dose caffeine, L-theanine, Racetam analogues, Alpha-GPC, Herbal stimulants (ginseng, guarana)

Eg: Alpha Brain®, Qualia®, Mind Lab Pro®, Noopept®

Risks:

- Limited high-quality efficacy data
- Sympathomimetic effects when combined with caffeine
- Poor labeling accuracy
- “Cognitive” supplements frequently function as stimulants in disguise

Supplements:

Take-Home Points

- Weight-loss and pre-workout products are high-risk for adulteration with unlisted stimulants or prescription drugs (e.g., DMAA, sibutramine).
- Unlike medications, supplements can reach the market without proof of safety; supplements are not recommended for routine performance or weight loss.
- Common effects include ↑ blood pressure, heart rate, QT prolongation, arrhythmias, MI, stroke, and hepatotoxicity.
- Stimulant-containing supplements should be avoided in patients with cardiovascular disease or hypertension.

Red flags:

- Palpitations, syncope, chest pain in young patients
- History of “pre-workout,” “fat burner,” or stacked supplement use

Conclusions

Conclusions

- Energy drinks =
pharmacologic stimulant beverages
- Electrolyte mixes =
situational tools
- Supplements =
poorly regulated stimulants
- Water + Nutrition + Training + Sleep =
outperform all three!

Counseling Patients

- Routine screening for energy drinks, electrolyte mixes/powders, & supplements should be done:
Normalize the Q: *“Many patients use these—do you?”*
- Energy Drinks: Limit total caffeine & stop if symptoms
- Electrolyte mixes: match intake to sweat loss; prefer minimal additives; food sources often suffice
- Supplements: not recommended for performance/weight loss
- Avoid judgment, explain mechanisms and adverse effects in simple terms, and recommend safer alternatives
- Prioritize sleep, nutrition, and training

“There are no secrets to success. It is the result of preparation, hard work, & learning from failure.”

– General Colin Powell.

Post-Talk: MCQ

MCQ 1

A 26-year-old male who jogs about 12 miles/week reports intermittent palpitations. Denies syncope, chest pain, or dyspnea. He drinks 1-2 Monster® 24-oz energy drinks daily and mixes energy drinks with alcohol socially. Family history of thyroid disease. Vitals: BP 138/90 mmHg HR 70 bpm. Labs normal. ECG: sinus rhythm, early repolarization pattern, frequent PVCs.

Which is the MOST appropriate next step?

- A. Start beta-blocker therapy
- B. Coronary CT angiography
- C. Counsel stimulant/alcohol reduction and obtain 24-hr Holter
- D. Electrophysiology study
- E. Restrict from exercise

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- A. Start beta-blocker therapy
- B. Coronary CT angiography
- C. Counsel stimulant/alcohol reduction and obtain 24-hr Holter
- D. Electrophysiology study
- E. Restrict from exercise

MCQ1 : Answer

C. Counsel stimulant/alcohol reduction and obtain 24-hr Holter

Isolated PVCs with early repolarization in asymptomatic athletes are usually benign. First-line management is trigger reduction (caffeine, energy drinks, alcohol) and ambulatory monitoring to quantify PVC burden before pharmacologic therapy, invasive testing, or sports restriction.

Why others are incorrect:

- A. Start beta-blocker therapy → Medical therapy is not first-line before removing reversible stimulants and objectively quantifying PVC burden.
- B. Coronary CT angiography → Advanced ischemic testing is not indicated in a young patient with low coronary risk and no ischemic symptoms.
- D. Electrophysiology study → Invasive electrophysiologic testing is reserved for high-risk features, sustained arrhythmias, or syncope.
- E. Restrict from exercise → Benign PVCs in a structurally normal heart do not require exercise restriction.

References:

ACC/AHA Ventricular Arrhythmias Guideline 2017; ESC Sports Cardiology Guideline 2020; ACSM Clinical Exercise Statement 2021; Marcus GM, JACC 2020.

MCQ 1a

He stopped drinking energy drinks and palpitations resolved. Two weeks later, the 24-hr Holter shows no PVCs. He asks what to drink instead for hydration and health. He jogs on a flat 3-mile course about 4 times/week, has no cardiac disease, and wants to avoid recurrence of palpitations.

Which is the MOST appropriate recommendation?

- A. Sugar-sweetened sports drinks
- B. Energy drinks with lower caffeine
- C. Plain water as primary hydration
- D. Pre-workout stimulant supplements
- E. High-dose electrolyte tablets daily

MCQ 1a

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- D. Pre-workout stimulant supplements
- E. High-dose electrolyte tablets daily

MCQ 1a : Answer

C. Plain water as primary hydration

Water is recommended for routine hydration in recreational athletes and avoids stimulants linked to PVCs. Sugary sports drinks add excess calories; energy drinks and pre-workout supplements contain caffeine and sympathomimetics; high-dose electrolytes are unnecessary without prolonged endurance or heavy sweat loss.

Why others are incorrect:

- A. Sugar-sweetened sports drinks → Unnecessary for short, moderate exercise and add excess sugar without hydration benefit.
- B. Energy drinks with lower caffeine → Even reduced caffeine and additives can trigger recurrent palpitations.
- D. Pre-workout stimulant supplements → Often contain sympathomimetics that increase arrhythmia risk.
- E. High-dose electrolyte tablets daily → Excess sodium offers no benefit and may worsen blood pressure.

References:

ESC Sports Cardiology 2020; ACSM Exercise Hydration Statement 2021; ACC/AHA Ventricular Arrhythmias 2017; Higgins JP et al, Curr Sports Med Rep. 2018 Feb;17(2):65-72.

MCQ 2

A 34-year-old recreational runner presents with palpitations after workouts. She runs 30–40 minutes at moderate intensity and reports daily use of Force Factor Liquid Labs Energy Electrolyte Powder, a commercially available electrolyte mix containing sodium, sugar, and added “energy boosters.” She asks whether this is necessary for hydration.

Which recommendation is most appropriate?

- A. Continue electrolyte mixes to prevent exercise-induced arrhythmias
- B. Replace with plain water during routine exercise
- C. Increase electrolyte intake to reduce blood pressure variability
- D. Switch to a low-sodium sports drink with stimulants
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MCQ2 : Answer

B. Replace with plain water during routine exercise

For most recreational exercisers, water is sufficient for hydration and avoids excess sodium, sugar, and stimulants. Guidelines reserve electrolyte replacement for prolonged (>60–90 min), high-intensity exercise or heavy sweat losses.

Why others are incorrect:

- A. Continue electrolyte mixes to prevent exercise-induced arrhythmias → Electrolyte drinks do not prevent arrhythmias during routine, moderate-intensity exercise.
- C. Increase electrolyte intake to reduce blood pressure variability → Increased sodium intake may elevate blood pressure without cardiovascular benefit.
- D. Switch to a low-sodium sports drink with stimulants → Stimulants can provoke palpitations and do not improve hydration.
- E. Use electrolyte mixes only if sweating is minimal → Electrolyte supplementation is unnecessary for routine exercise regardless of sweat volume.

References:

J Acad Nutr Diet 2016;116(3):501–528. Scand J Med Sci Sports 2010;20(Suppl 3):40–47. JACC 2018;71(19):e127–e248. JACC 2024;83(16):1689–1705.

MCQ 3

A 28-year-old man presents with palpitations and lightheadedness after starting Inno Shred™ an over-the-counter “natural” supplement for weight loss and as a pre-workout supplement to enhance his gym performance. He denies drug use. ECG shows QTc prolongation. Electrolytes and thyroid studies are normal. He asks why this occurred after using Inno Shred™.

Which statement best explains his presentation?

- A. Dietary supplements undergo FDA pre-market safety testing
- B. Most supplements contain only labeled ingredients
- C. Undeclared stimulants are common in supplements
- D. Supplements are safer than prescription medications
- E. Cardiac toxicity occurs only with anabolic steroids

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MCQ3 : Answer

C. Undeclared stimulants are common in supplements

Dietary supplements are regulated as foods, not drugs, and require no pre-market safety testing. Many contain undeclared sympathomimetics associated with palpitations, hypertension, QT prolongation, and emergency department visits.

Why others are incorrect:

- A. Dietary supplements undergo FDA pre-market safety testing → No FDA pre-market safety testing is required for supplements.
- B. Most supplements contain only labeled ingredients → Mislabeling and undeclared stimulants are common.
- D. Supplements are safer than prescription medications → “Natural” does not equal safe or regulated.
- E. Cardiac toxicity occurs only with anabolic steroids → Many non-steroid supplements cause cardiac toxicity.

References:

Clin Toxicol 2019;57(2):125–130. Am J Cardiol 2014;113(1):168–172.

Thank you 😊

If you *enjoyed* my presentation,
I would be *honored*
to receive a *great*
feedback score on
your evaluation of
me!



Questions?



**EVERY DAY IS
ANOTHER CHANCE
TO GET **STRONGER**
TO EAT **BETTER**
TO LIVE **HEALTHIER**
AND TO BE THE BEST
VERSION OF **YOU****

